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EDITORIAL.

IT IS WITH MUCH pleasure that we are able to announce that Dr. Thos. Kirke Rose and Mr. Henry F. Collins, both of whom are well known to our readers as authoritative writers on metallurgy, have consented to become Special Contributors to the ENGINEERING AND MINING JOURNAL. An old friend of this JOURNAL, and one of its most able technical writers, Mr. Louis Janin, Jr., will resume his connection with us as a Special Contributor. Furthermore, recognizing the importance of the coal industry of this country, we have obtained the consent of Messrs. Wm. N. Page, F. Lynwood Garrison, Wm. Griffith and Edward H. Coxe to act as Special Contributors on coal mining. Apart from the direct importance of the subject, it has an indirect value by reason of the fact that in the handling of large quantities of material, the colliery engineer is often in a position to afford useful suggestions to the metal miner.

AT A TIME WHEN the Transvaal is about to import Chinese coolies, it is interesting to note that the new arrangement between the Mexican government and a steamship line places no limit on the number of Chinamen which can be landed at the port of Manzanillo. Mexico needs them, not for the mines alone, but also on the plantations.

IT IS ANNOUNCED that the H. C. Frick Coke Company is once more in the open market, and is offering coke for sale to outside parties. For considerably over a year all the coke made by this company at its Connellsville mines has been taken by the United States Steel Corporation, and the present action is rather significant. It is evident that the curtailment of production by the blast furnaces is taking full effect in the Central West.

THE LONG-CONTINUED dry spell in California ended on November 4, when heavy rain began to fall in San Francisco. This has been one of the heaviest droughts known in that State for many years, no rain having fallen from April 16 to November 4, a period of 202 days, with the exception of a very slight shower on October 8, which, however, was only felt in San Francisco and at some points along the coast. In consequence of this drought, there has been a scarcity of water, even in the mountain districts, and many mines and mills have been forced to shut down. The effect will doubtless be shown in a lessening of the yearly gold production of the State.

THE ARTICLE on another page referring to iron deposits in the province of Bulacan, in the Philippine Islands, is interesting as showing that our new possessions in the East have some valuable mineral resources. It shows also that the Philippine Mining Bureau is doing some excellent work, though its resources in men and means have been limited.

There are also difficulties arising, from the nature of a tropical country, which make field-work extremely arduous. The Bureau deserves much credit for the work it has done, and is doing, in the face of all obstacles. We hope hereafter to give further summaries of the results attained.

WE CONSTANTLY SEE references made in our esteemed daily contemporaries to the "official prices" of steel and iron. The term is entirely a misleading one. Who is the officer who fixes such prices? And whence does he derive his authority? Presumably the reference is to the quotations made by the United States Steel Corporation; these have weight, certainly, since the corporation is a very large producer, but they are not in any sense official or binding on other makers. As recent experience has shown, these can, and do, sell at prices varying considerably from those of the Steel Corporation. The iron market is an open one, and to talk of official prices is absurd.

SHIPMENTS OF iron ore from the Lake Superior region in October were approximately 3,000,000 tons, making a total for this season, up to November 1, of 22,375,000 tons. This is 1,645,000 tons less than at the corresponding date last year. In previous statements we estimated the total for the current season at 25,000,000 tons. It seems doubtful, however, whether this total will be reached. There is ore enough mined, and the November shipments could easily be large enough to make up the total named, if necessary. It is evident, however, that, from now on to the close of navigation, shipments will be light. The United States Steel Corporation is withdrawing its ore-boats, and other companies are following its example.

SOME OF THE BEST WORK, in the way of economical mining, in Western Australia is being done by mining engineers who have been trained in Colorado and California. The Cosmopolitan mine holds the record, among the important properties of Western Australia, with total working costs at 18 shillings 9 pence, equivalent to $4.50, per ton of 2,240 pounds. The manager is Mr. H. A. Shipman, who won a good reputation when in charge of the Independence mine, at Cripple Creek. It speaks well for the progress made in Westralian mining methods when 5-dwt. gold ore can yield a margin of profit. In 1897 very few companies worked ounce ore with any benefit to the shareholders. Necessity is the spur to economy, and the passing of the boom period, with its sensational returns from specimen ore, has brought in an era of technical skill such as will contribute undoubtedly to the advancement of the engineering profession.

THE ORGANIZATION OF A Citizens' Industrial Association of America, which was carried out recently at Chicago, is a sign of the times. Among the purposes to be kept in view are these:

"To assist by all lawful and practical means the properly constituted authorities of State and Nation in maintaining and defending the supremacy of the law and the rights of the citizens.

"To promote and encourage harmonious relations between employers and their employees upon a basis of equal justice to both.

"To foster and encourage by legitimate means the individual enterprise and freedom in management of industry under which the people of the United States have made this the most successful and powerful Nation in the world."

If successful in its efforts, this association will prove of service in restricting the excesses of trades-unionism. In opposing the tyrannical principle of the closed shop, and in defending the non-union workman in his efforts to remain independent, it will have a useful field of service. A movement such as this indicates forcibly that public opinion is getting weary of the abuse of the power secured by labor-unions. A man is as much at liberty to organize as to remain independent, but when those who do organize take it upon themselves to control those who do not, and proceed from this point to insisting that a third party, the employer, shall assist them in their simple notions of tyranny, it is high time to call a halt. This is what citizens' alliances all over the country are commencing to do.

MR. ROOSEVELT AND THE BUTTE UNION.

It is announced that, upon the invitation of the President, six representatives of the Butte labor-unions will dine at the White House on November 18. This statement, appearing in most of the daily papers, has received but little comment from the eastern press, although we feel assured that its significance is fully appreciated in the West, where the history and performance of the Butte Miners' Union are only too well known.

Whether the action of Mr. Roosevelt is prompted by the impulse of hospitality in return for courtesies received by him during his recent visit to Butte, or whether it is due to political sagacity, we do not know, nor does it concern this technical journal; whether the motive be entirely creditable or distinctly blameworthy, we do know that this official recognition of the Butte labor-union is calculated to inflict grievous injury upon the mining industry of the whole country.

Before issuing dinner invitations to these men it would have been well if the President had requested his detective service to inquire into their antecedents; of course, it is not usual to institute such search into the character of guests, but, on the other hand, it is not customary to invite people of this description to an official dinner at Washington. In default of such an inquiry we can state that what the Clan-na-gael has been to the brutalities of Irish politics, what the Mafia has been in the bloody feuds of the low-born Italians, that the Butte Miners' Union has been to the labor troubles of our western mining camps. The unspeakable barbarities of the Coeur d'Alene strike, the anarchy which disfigured Leadville, the assassinations and murders which made Telluride a by-word, the disorders at Cripple Creek—these, every one of these, have received their mainspring and their sustenance from the gang of ruffians who have controlled the union at Butte. If they have been permitted to maintain their organization at Butte City itself, it is only because Marcus Daly used the union to control Montana politics, Clark bribed outright, while Heinze and the Amalgamated were so busy with their cat-and-dog fight that they had no time to spare for the decencies of civilization.

If ever there was an organization which deserves to be condemned by honest men, it is the labor-union whose leaders are expected at the White House next week. Wherever a mine manager has tried to treat his men humanely and to give each that equality of opportunity to work, which is the American's heritage, there this gang of Irish-Austrian-Italian anarchists has sent its emissaries to stir up trouble. Wherever a mining community has been pursuing the even tenor of its way attended by prosperity and quietness, there these agitators have incited foul murders and cowardly assassinations. It is all well known to the mining men in the West, so well known, alas, that it ceases to excite the fierce resentment which it warrants, until once in a while a friend disappears in the dark or is riddled with bullets in broad daylight. At such times, indeed, we feel like moving heaven and earth to see justice done, only to run into an impassable quagmire of muddy foulness—which is called local politics! Is the chief executive, a man held by his friends to be the best type of American manhood, is he going to do an act for politics' sake which will be taken as the endorsement of the most un-American tyranny that ever existed on this continent? We hope not; most sincerely.

PRESENT CONDITIONS IN THE SEABOARD BITUMINOUS TRADE.

It frequently happens that people undertake to do the right thing at the wrong time, or undertake tasks beyond their ability. Recent developments, in connection with the original intentions and actual accomplishments of several great industrial corporations, bear witness to the truth of the above statement, and a somewhat parallel instance may be shown by a brief review of the course of the Atlantic seaboard bituminous trade during the present year.

The great strike of the anthracite miners last summer created a shortage of fuel for steam production as well as for domestic purposes. Industrial activity was at its height; mills and manufacturing plants of all kinds, in the northeastern section of the United States, needed every pound of coal they could get. At the same time the railroads, either through inability or a mistaken policy, did not furnish, to producers of bituminous coal, cars enough to bring supplies at tidewater up to market requirements. The result was that prices of bituminous coal advanced in proportion almost as much as those of anthracite, and at the end of the year ordinary grades of Clearfield, which in a year of normal activity would have sold for, say, $2.50 f. o. b. tidewater, were hard to get at $9. As a result of these phenomenal prices, prevailing for several months, bituminous producers worked their mines to the utmost, the mines along the Pennsylvania Railroad, east of Pittsburg, showing the greatest increase of any year in the history of the trade. In the spring of 1902, quotations had fallen, but producers, not satisfied with the profits they had already made, thought they could maintain prices at a considerably higher level than previous to the strike, while mining much more coal.

There is no hard-and-fast combination of producers to control prices on bituminous coal shipped to tidewater, but a body of producers and middlemen, known as the Bituminous Association, holds meetings in New York early each year to talk over the season's outlook and informally agree on mine prices. This association, in February of this year, named a price of $2 per ton at the mines for ordinary grades of Clearfield, which, with a freight rate of $1.50 to tidewater, made the selling price f. o. b. New York harbor shipping port $3.50 per ton; and producers of special grades, such as Georges Creek, named higher prices. Subsequently, the spring crop of labor disputes caused many manufacturing plants to close, and, with a falling demand for coal, those mining companies which had not succeeded in covering the greater part of their output by contracts at high figures, began to sell for what they could get. By July ordinary grades of Clearfield were selling for less than $3, at New York harbor. Ultimately, this drop began to affect the producers of the special grades, until finally a certain large West Virginia combination, which was selling its coal at tidewater for $3.29 per ton, found a small rival company selling practically the same coal for $2.65. Finally, in October, a big Pennsylvania and Maryland combination cut its prices 50c. a ton, and all producers agreed to sell for what they could get, regardless of contracts made early in the spring. Such action naturally

demoralized the trade, and conditions have not improved materially yet.

It is obvious that all producers made a serious blunder in naming very high prices in the spring, and that producers of special grades blundered in cutting prices in October, instead of selling a reduced output at contract figures; because, when the contracting season opens next spring, consumers with this season's experience in mind may prefer to buy coal as they need it during the season. Present industrial conditions, the productive capacity of the mines, and the equipment of the railroads, are all against any higher prices for coal.

THE BUTTE SITUATION.

Two weeks ago we referred to the extraordinary situation in the Butte mining district, and the closing down of the mines and smelters of the Amalgamated Company in that district. This action, as we then noted, threw out of employment without notice some 12,000 men, while the reduction in the copper output of the district was an important one. The reduction is somewhat larger than was estimated in our previous article. We are reliably informed that the production of the Amalgamated mines and smelters, just before the shut-down, was at the rate of 20,000,000 lb. per month, which would make the daily production over 650,000 pounds.

Since our previous article, apparently little change had taken place in the relations of the two parties. The offers made by Mr. Heinze for a settlement were not entertained by the Amalgamated Company. Indeed, it was not at all probable that they would be accepted, and Mr. Heinze himself would, in all likelihood, have been more surprised than any one else had they met with favor at the hands of his opponents. The injunction case against the Boston & Montana and the Parrott companies is now in the hands of the Supreme Court of the State on appeal from Judge Clancy's decision in the district court.

Statements have been issued by both parties, but they do not add materially to our knowledge of the affair. That made by the lawyers for the Amalgamated Company consists principally of attacks upon the judge who granted the injunction. Whatever the merits of the case may be, the integrity of the court is a matter which we cannot pretend to pass any judgment upon here. It is very much to be regreted, however, that there should be any opening for such an attack, whether it is really deserved or not. The statements put out by the Heinze party amount to little more, and the further the discussion goes the more involved matters seem to be.

On November 10, however, it was announced that Gov. Toole, of Montana, had agreed, after certain negotiations with Mr. William Scallon, President of the Anaconda Mining Company, and representative of the Amalgamated interests in Montana, to summon a special session of the Legislature on December 1, with a view to the enactment of what is locally called "a fair trial bill," providing for the removal of any case from any court, where bias or prejudice could be shown on the part of the judge. It is fair to the Governor to state that, before consenting, under pressure from Butte, to take this extraordinary action, he made an emphatic protest, which concludes as follows:

"I am firm in the conviction that it were far better for the State of Montana as a whole that this calamity, bad as it is, should continue indefinitely than that a precedent should be established by which legislation of a given kind should be a condition precedent to the doing or omission of any action by any corporation or individual in this State. Indeed, I do not think any other conclusion is consistent with the genius and spirit of our Government, which demands the free and untrammeled action of its legislative department."

The fact that the Governor gave way, although this protest evidently expressed his opinion of the whole case, shows the remarkable nature of the situation, and the urgent quality of the protests which were made to him from the Amalgamated on one side, and from the representatives of the miners on the other. Perhaps a State executive has seldom been placed in so difficult a position.

Following this action on the part of the Governor, orders were issued on the same day to resume operations at all of the mines and smelters, and, by this time, they are fully at work. This action, however, really makes little change in the existing conditions, as the State is still at the mercy of two contending corporations. The situation is truly an unfortunate one. The blame undoubtedly rests upon both parties to the contest in a share so nearly equal that it would be very difficult to apportion it. Back of all this, however, is the corruption in Montana politics, which has brought its judiciary into disrepute and laid its courts open to the charges of making inequitable decisions and of possible corruption. This is a direct result of the fostering of trade-unionism and populistic tendencies by the men who formerly controlled the politics of the State—a course which has been unhappily continued by the present contestants for power in Butte.

MARKET CONDITIONS.

November 11.

The metal markets have been for the most part quiet, with very few new developments.

Copper is an exception to the general rule; while the business done has not been on a very large scale for domestic trade—though it has been somewhat better for foreign business—the market has been agitated by the reports from Butte. The announcement to-day of the reopening of the Amalgamated mines and smelters was followed by a fall in prices, owing to the passing of anticipations of short supplies. On the other hand, the market abroad, while it was affected in the same way by the Montana news, met with a counteracting influence in the announcement of a strike of the workmen at the Rio Tinto mines. We are not yet fully informed as to how far this strike extends, and it is impossible to judge of its probable duration.

Tin has been quiet, with a moderate demand, and downward fluctuation in prices.

Lead has also been quiet, and there appears to be a falling off in the immediate demand from consumers. This is due, probably, to a smaller consumption in the building trade, and the stoppage of work in several places.

Spelter is again weak, as the galvanizers have not been taking much metal, while the brass-founders' requirements have also been moderate. The price of zinc ores in Joplin has been somewhat lower. The miners, however, have done nothing further with regard to their proposed plan to limit production.

Silver shows little change, except that it is slightly weaker. The demand for Indian coinage has been temporarily satisfied, and the French orders have been filled. There is still considerable buying in London, which is supposed to be intended for China.

The demoralization in the iron trade continues. The cutting in steel billets, which is referred to elsewhere, has led to anticipation of a general reduction in prices, and consumers are reluctant to buy on what they consider to be a falling market. New contracts are scarce, and sales, which are made from day to day, are generally small, and are evidently intended only to fill immediate requirements. It looks very much as though the market had not yet reached bottom; at least that is the general impression. There has been some talk of export trade, but little has actually been done. It is understood that some orders for rails have been taken, but nothing else is noted beyond the usual business. There was a report that a large order for plates had been placed here for exporting. The fact seems to be that at the time of the consolidation of a number of steamship lines last year a part of the agreement was that the repairing of the vessels should be done by Harland & Wolff, in Belfast, Ireland, and that that firm should take the steel required from the United States Steel Corporation. The amount needed is, of course, uncertain.

The Western coal markets are generally quiet, with a smaller demand reported in most places for factory coal. The lake trade for the season is nearly over. Very little complaint is heard of transportation troubles.

The anthracite trade continues quiet, with no material change from the conditions noted last week.

The seaboard bituminous trade is very fully treated in another column. Business remains quiet with no especial incident.

ROBERT B. TURNER.

Among the fatalities of recent occurrence we regret to note the death of Mr. Robert B. Turner, superintendent of the Kearsarge mine at Virginia City, Montana. A fire broke out in the shaft-house, and the smoke was swept into the mine so as to suffocate several men. Mr. Turner did his utmost to rescue those who were underground, and eventually himself succumbed. As a manager and as a cyanide expert he was well known in Colorado, where he lived in early youth, and in the northwestern mining regions; but he evidently possessed a virtue rarer than technical skill, and gave his life to help those who were in danger. He died doing his duty. Better epitaph there is none.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

It has been found beneficial to add blast-furnace slag to portland cement for use in sea-water.

Slags allowed to cool slowly are only feebly hydraulic, hence for use in cement they must be cooled very rapidly, which renders them quite porous and energetically hydraulic. The sudden cooling also removes a portion of the sulphides, which are probably the cause of disintegration of slag cement when exposed to air.

Cements made with hydraulic lime are less liable to fissure and disintegrate, when used in air, than those in which a fat lime is used; although it is said there is no gain in tensile strength.

The settling of a cement involves a chemical action, hence the settling is accelerated by heat or by fineness of grinding, and retarded by cold or by coarse grinding. If a cement has normal settling properties at normal temperature, these properties will be proportionally modified at a higher or lower temperature.

Nickel-copper alloy (Ni 20 per cent, Cu 80 per cent) is used for casing bullets for small-bore rifles by all the armies of Europe. This alloy has a higher degree of tenacity than the best brass, combined with a high co-efficient of elongation.

The heat necessary to soldering anneals aluminum wires, thereby reducing their strength one-half.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

WITWATERSRAND GOLD DEPOSITS.

The Editor:

Sir.—In the article by Mr. G. A. Denny on the Witwatersrand ore deposits, an abstract of which appears in the JOURNAL for October 31, some points seem to have been either overlooked or entirely ignored which have already been brought up long ago by former writers in answer to the theories which Mr. Denny defends.

Mr. Denny's theory, if I understand his article correctly, is that both the gold-bearing pyrite and the pebbles of the conglomerate came from pre-existing formations, which were eroded, transported, deposited in a shallow sea, and worked over by wave action.

One of the facts which he quotes to support this view is the occurrence of rounded grains of pyrite, saying that the form of these grains is due to attrition. I think that few geologists will admit the possibility of pyrite being subjected to such natural conditions as will form a rounded grain out of an angular one without becoming entirely decomposed; further than this, an examination of thin sections of these grains, under the microscope, often reveals a cluster of chlorite at the center, which is strong evidence for the theory that the pyrite is a replacement, and that the rounded form is due to the original shape of the mineral which has been replaced. I may also add that in the schists near Mineral City, Va., rounded chalcopyrite grains occur which cannot possibly have a sedimentary origin, owing to the nature of the enclosing rocks, but are presumably due to a replacement of some other mineral.

Mr. Denny goes on to compare the Rand conglomerate with the gold placer deposits of to-day, but this comparison seems to me to be utterly out of place. If there are any placers in which practically all of the gold is contained in fairly bright unoxidized grains of pyrite, as it is in the Rand conglomerate, I think all mining engineers and geologists would be much interested to hear about them, as no such placers have as yet, to my knowledge, been described.

The theory that the gold-bearing pyrite of the Rand was originally deposited as a precipitate from a sea saturated with solutions of gold and iron has been so thoroughly exploded by J. R. Don,[1] John Hays Hammond[2] and others, that I will not even attempt to repeat their arguments.

Judging from the abstract in the JOURNAL, it seems that Mr. Denny has very much underrated the importance of the objections to the sedimentary theory and the arguments for the 'infiltration' theory, as the former demands processes which are physically impossible under natural conditions. D. B.

New York, Nov. 2, 1903.

WITWATERSRAND GOLD DEPOSITS.

The Editor:

Sir.—Having read with interest the article on the Witwatersrand ore deposits appearing in your issue of October 31, I feel it may not be out of place to mention two important facts bearing directly on the fundamental principles of both the aqueous and infiltration theories. The discussion of the genesis of ore deposits has reached a stage where a *post mortem* of the accepted theories and well-digested criticisms would only be a step backward. There must still be, however, a partial retracement of the already well-trodden ground. The progress of this subject in the future, now that the initial impulse has slackened, must necessarily be slower. From time to time the laborious task will present itself of withdrawing much inferior data in order to concentrate facts that collectively will form one continuous chain of proofs, supporting the theorems of the genesis of ore deposits.

Every theory on the formation of the ores associated with the conglomerates of the Witwatersrand must explain, first, the relation of the mineralization of the dikes to the mineralization of the conglomerates, and, second, the origin of the rounded and seemingly water-worn grains of pyrite occurring in the interstices of the conglomerates.

The first can only be answered by a detailed field and petrographical study of the ore, with the supposition that the mineralization of the dikes and conglomerates was contemporaneous.

The second point is most important. The pyrite grains in the conglomerates are rounded, and when examined under the microscope are found in many thin sections to contain chlorite cores. It is most probable that the pyrite has replaced original detrital material, such as magnetic or the hydrous oxides of iron, which probably had their ultimate source in vein-quartz, and were decomposed under the action of hydrogen disulphide and afterward reprecipitated.

I have found rounded grains of pyrite similar in every respect to the Rand occurrence in chlorite-schists, in which case there is strong evidence for believing the pyrite has replaced some such mineral as garnet or magnetite.

Mr. Denny has treated his subject purely from the geological standpoint. The interesting feature of the Rand conglomerates is the fact that two minerals, almost at the extremes of the scale of susceptibility to decomposition, are ultimately associated. Both of these minerals appear as excellent examples of detritus, and still the less resistant one of the two retains its fresh metallic luster. Mr. Denny seeks to prove the formation of these conglomerate beds by comparing them to recent analogous placer phenomena. There is no reason to suppose that pyrite in more or less advanced stages of oxidation should not occur in the immediate vicinity of its ultimate source, but to apply this fact to the deposition of sediments in an "enormous sea" and still expect the pyrite to occur bright and unoxidized necessitates the acceptance of a theorem unsupported by any geological data.

There are many interesting points in connection with the auriferous deposits of the Rand that are still unsolved. I have mentioned two facts bearing on the problem, which have not as yet been given their just importance, in the extensive discussions of the origin of these ore deposits.

New York, Nov. 3, 1903. J. P.

RAW SULPHIDE SMELTING.

The Editor:

Sir.—In reply to your request to participate in the discussion on raw sulphide smelting, allow me first to raise the question as to the descriptive phrase, which is substituted for what we have heretofore known as 'matte smelting' or 'pyritic smelting.' Fault can be found with any one of these phrases, yet it seems to me that the old description of 'matte smelting' is least open to criticism. It refers to the product that is aimed at, whether the crude ore be smelted raw, or roasted, and, as I shall attempt to show, the two methods merge into each other so that there is no sharp dividing line, and no one misunderstands what is meant. On the other hand, the term 'raw sulphide smelting' may be applied to other processes than the smelting of a pyritous ore to a matte. For example, galena is smelted directly, both by the precipitation method in the blast furnace and by the roast reaction method in reverberatory furnaces and Scotch hearths, and those certainly are forms of raw sulphide smelting.

In the matte-concentration of pyritous ores, every one, who has attempted a roasting in heaps or stalls, has observed the formation of stall-matte, and the idea of effecting the concentration of the ore by one smelting operation, utilizing the fuel value of its sulphur contents, must early have occurred to metallurgists. This was developed into the process of pyritic smelting, which excited much discussion a few years ago. The great feature of that process was to dispense entirely with the use of carbonaceous fuel. I believe that has indeed been done at Tilt Cove, Newfoundland, and at Mt. Lyell, Tasmania, but in general it has not proved to be a practicable process. The smelting of raw pyrite with a comparatively small proportion of fuel has become, however, a recognized metallurgical method, which is employed successfully at numerous places. The distinction between this and smelting after a preliminary roast is only one of degree, and the choice of a particular method must be governed in each case by the conditions.

In most blast furnaces employed for the smelting of cupriferous pyrite there is, besides the reducing action, a more or less powerful oxidizing effect, which serves to burn off part of the sulphur in the charge. The same is true, even in the lead blast furnace, and it is now the common practice to put rich galenas on the charge raw, some of their sulphur going into the matte and some being burned off. All of these furnaces have a factor of oxidation, which must be known approximately before the charge can be calculated. This is true, whether we are considering the smelting of raw pyrite or pyritous ore that has previously been burned down to 7 or 8 per cent sulphur. The question is, What is the cheapest way of getting rid of the sulphur?

In this connection it is to be remarked that the roasting of pyritous ores is not necessarily an expensive process. Lump ore can be roasted in stalls for about 50c. per ton, including transportation to the furnace, and the first cost of plant is moderate. Fines can be roasted with the lumps to the extent of, say, 10 per cent. Fine ore alone is roasted at Butte, Mont., in the McDougal type of furnace for as low as 33c. per ton, not including transportation to and from the furnace. In order to determine the best method of smelting, such figures as these have to be combined with the cost of the blast-furnace work, taking into account the quantity of fuel consumed in the latter, the matte-fall, etc. The conditions are affected, of course, by the character of the original ore, which may be all fine, or composed of lumps which crumble and are unsuitable for stall roasting. In large operations also, the process has to be considered in connection with the converting of the matte into blister copper, which final step is, indeed, pyritic smelting.

One of the most interesting fields of matte smelting is the concentration of values at mines in remote locations, as, for example, in Mexico. Cases can be found there where ore worth $50 per ton is produced at localities whence freight and treatment charges come to $70 per ton, obviously an impossible proposition, without an intermediate step. By effecting a concentration of 10:1, a ton of matte, worth, say, $400, may be produced from 10 tons of ore and business can be done. In such undertakings small furnaces are likely to be employed, and the conditions are widely different from those which obtain at Salt Lake City, in British Columbia and other places, where big tonnage is to be handled—charcoal may be the only available fuel—a high degree of concentration is desirable, and comparatively easy-running slags are likely to be a necessity. I am disposed to think that these results can be more easily obtained by smelting partially roasted ore than by smelting raw ore.

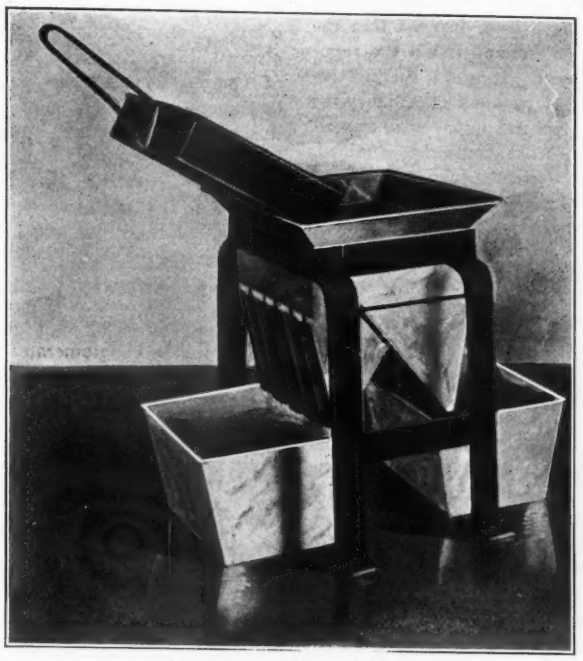
In one undertaking of that kind, we aimed to burn the ore in stalls as completely as possible. There was a surplus of fines, and these we jigged, putting the concentrates on the stalls as covering. The furnace was a small one, and, with too small a matte-fall, gave trouble. This could be remedied by putting on the charge some raw concentrates, of which there was always a large supply, and thereby increasing the

[1] American Institute of Mining Engineers. *Transactions*, XXVII, 564.

[2] American Institute of Mining Engineers. *Transactions*, XXXI, 841.

matte-fall. If there is too little sulphur in a charge it is always possible to tone it up to any desired degree, without any trouble at all. We had an ore which contained about 50 oz. silver and 1 oz. gold per ton, with generally about 1 per cent copper. There was a high recovery of gold and silver, and, apparently, there need be no fear on that score, when there is 1 per cent copper in the ore, or even less. An important consideration, however, is the relative specific gravity of the matte and slag, and the temperature at which they are discharged into, and maintained in, the settler. The loss of value in the slag is due largely to particles of entrained matte, and there will be obviously the best separation, at a certain temperature, when the slag is silicious or calcareous (of low specific gravity) and the matte is high in copper (of high specific gravity). The most unfavorable combination occurs in smelting a zinky ore, when the matte is bound to be mushy and light, on account of the presence of zinc, and the slag must be high in iron, therefore heavy, in order to carry off zinc. The difference in specific gravity between matte and slag is then small, and both matte and slag are rather infusible.

The pyritic smelters pronounce zinc-blende a good fuel, but I have never found it to be a desirable constituent of the charge for a matte-smelting furnace, at least not for a small furnace. Blende will burn fairly well in properly designed kilns; in stalls the combustion is very feeble and soon ceases. In the quick descent in a blast furnace a good deal must escape oxidation, and difficulties will ensue. There will be less trouble if the blende be in small pieces than if it is in large ones; but I should prefer to have the blende as completely oxidized outside of the furnace as possible, since then it will be easier to get rid of in the slag. There is a difference of opinion as to whether zinc oxide is carried chemically or mechanically in slag. It may be carried in both ways, but at all events there is no doubt that a slag, to be high in zinc, must be also high in iron and low in silica and lime. I have known slags containing 12 to 15 per cent ZnO to be successfully run in matte smelting, and 20 per cent ZnO is regularly run in lead smelting at certain places; but such slags must be high in iron.



A USEFUL SAMPLER.

The main difference in the matte-smelting process, as now carried out, lies in the percentage of fuel used. In the roasting-smelting process the proportion of coke may be something like 10 per cent of the charge; in raw-smelting it may be about 5 per cent. With coke costing $10 per ton, there is then a difference of 50c. per ton of charge on fuel account, which will come to somewhat more per ton of ore, according to the percentage of ore in the charge, to offset the cost of roasting. There is, on the one hand, a greater quantity of coke to be handled, but it is also to be remembered that the ore will have lost approximately 20 per cent of its weight in roasting. The difference in coke consumption measures substantially what is gained through utilization of the maximum fuel-value of the ore. The matte from the raw-smelting will probably be of lower grade, and the cost of converting it comes also into the consideration.

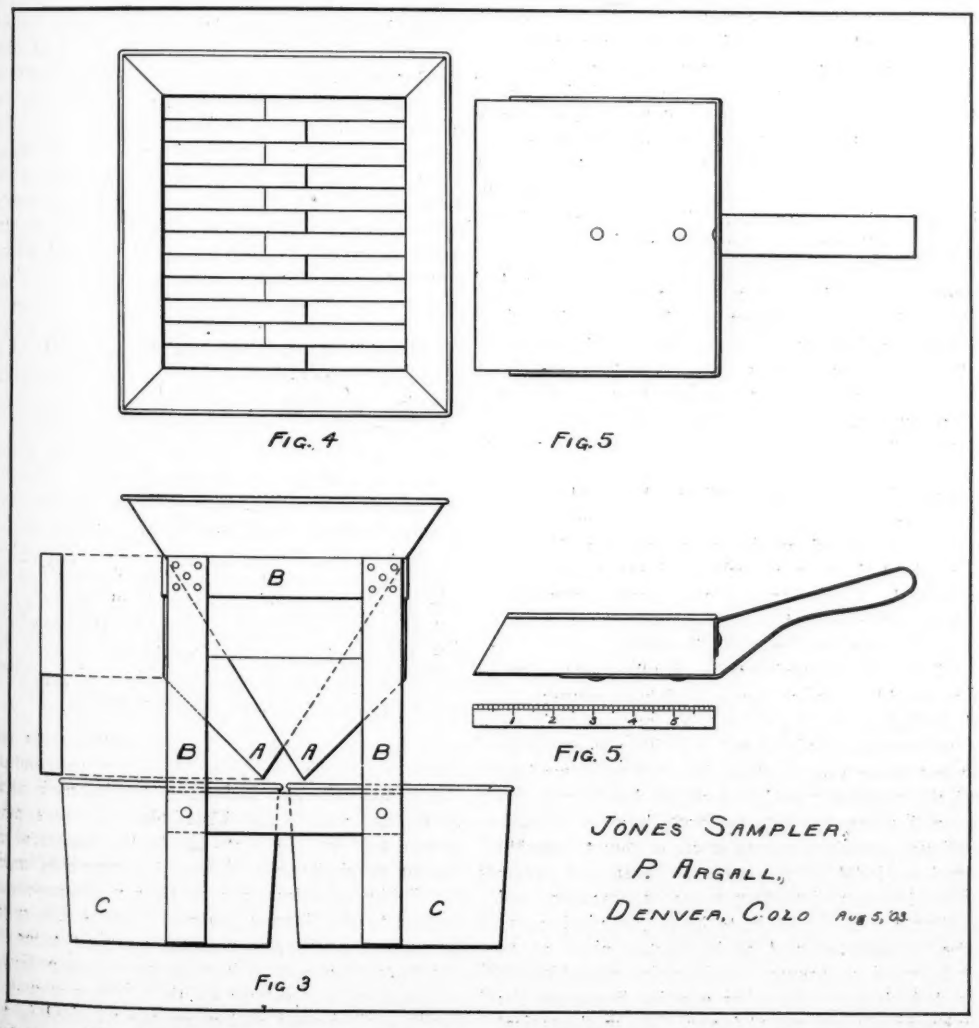


FIG. 4 FIG. 5

FIG. 5

FIG 3

The behavior of lead in the matte-smelting furnace is incidentally of some interest. I once put some galena on the charge as an experiment, and found that the lead was mostly volatilized, as was to be expected. The ore smelted contained, however, regularly a little lead, 0.5 to 1 per cent, some of which went into the matte and a little was reduced, although there was a strong oxidizing effect in the furnace. The metallic lead would work down into the brickwork of the hearth, and was extraordinarily rich in gold and silver, assaying about 7 per cent silver and from 0.5 to 2.5 per cent gold. Also, we found that the fire-brick would absorb gold and silver in a remarkable way, old bottoms assaying from 150 to 250 oz. silver and 8 to 20 oz. gold. The brick was colored a light purple and was visibly permeated with metallic specks and filaments, probably of speiss. The use of brasque bottoms prevented the seepage off of the rich lead, and they did not absorb gold and silver to anything like the extent the brick did.

Boston, Oct. 29, 1903. W. R. INGALLS.

A USEFUL SAMPLER.

The Editor:

Sir.—The accompanying drawing and photograph illustrate a sampling apparatus which I have found extremely useful. It is the Jones sampler, and was described by me in a paper on dry crushing (*Transactions* Institution of Mining and Metallurgy, London). Having reduced the ore to the size for cutting, I take up an evenly filled scoop and gently pour it over the riffles, the result being that one-half goes into the pan at the right, the other to the left; I take one of these for the sample, crush it finer, and repeat the operation. The advantages are cleanliness, no canvas to brush or clean, no plates to brush, none of the numerous errors due to quartering, and a great saving of time. I have two sets of this apparatus and use them for cutting down from the start to the finish, and never cone nor quarter. I did not think it worth while describing this method and apparatus in my discussion of your paper.

Denver, Colo., Aug. 5, 1903. P. ARGALL.

MINE SAMPLING.

The Editor:

Sir.—Referring to my article on 'Mine Sampling' in the issue of the JOURNAL of September 19, I am very glad to say that I have since learned that the method of sampling there described is not the regular one used by the engineer. It was a method resorted to under pressure of business expediency, as the time was short and a general impression was all that was desired and all that could be obtained. Consequently, it would be a great injustice to charge this method as the one usually employed, and I am very glad to make this corrected statement.

F. H. MINARD.

Denver, Colo., Oct. 26, 1903.

THE SAMPLING AND ESTIMATION OF ORE IN A MINE.

To the Readers:

Gentlemen.—Late contributions to this discussion demand acknowledgment, and in finally closing the consideration, for the present at least, of an important branch of mining practice, I desire again to thank those who have added to the usefulness of it by taking part in the discussion.

In regard to the matter of rolling sticky ore on canvas or duck, as discussed by Messrs. Richard A. Parker, W. L. Austin and G. M. Gouyard, any error due to this cause may arise from the fact that rich ore becomes powdered in the course of reduction, especially in the presence of pieces of 'gouge' or clay, such as frequently mark the walls of lodes. A sample of poor ore may become 'salted' if rolled on the canvas cloth which has been used in quartering a richer material. The discussion of this point serves to accentuate the dangers surrounding the quartering of samples; but while the use of canvas for this purpose is open to objections, it still remains the quickest way to accomplish the desired end—of reducing the bulk of the sample—in the absence of suitable split-shovels and other apparatus, which are not readily portable to distant mining localities. Wherever convenient, and especially in the case of the examination of important mines, I would advise the employment of a split-shovel and sampler, of the kind used in assay offices.

In regard to the use of a strip of canvas to catch the ore as it is broken, instead of using a candle-box, I cannot agree with Mr. Walter Harvey Weed, because, even if intentional 'salting' be prevented by excluding everyone save those engaged in taking the samples, unintentional interference with correct results will arise from the falling of bits of ore outside of the range of the section sampled. In many lodes carrying friable minerals or pulverulent ore, or even sugary quartz, which has been loosened during the course of mining, there will be a tendency for particles to drop onto the canvas from spots not being sampled, owing to the vibration set up by the blows of the hammer on the moil. Rock at a distance will be jarred loose and will get mixed up with the sample being taken. Of course, if the candle-box is not held near the face of ore, the chips broken off by the sampler will fly wide and some of the material broken will escape the box; but this, with a little experience, can be obviated. The man holding the box can put his hand up to the face of ore so as to catch the broken rock and the candle-box can be held so as to arrest the flying chips. In any event, to my mind the use of a canvas is open to the objection mentioned, and should not be resorted to except in *one* contingency—that is, when an engineer is alone, has no assistant with him, and has reason to distrust any help which is offered by those on the mine. Under such circumstances he cannot very well take a large sample without placing a canvas on the floor of the level or stope, so as to catch the ore broken down by him, because it is physically impossible for him to hold a box and break a sample at the same time.

The remarks of Mr. George A. Packard concerning low assays are much to the point. In ores containing metals in quantities large as compared to the minute proportion of gold usually present in lodes, there is a tendency for erratic low results to disturb the real average just as much as the "high assay" in gold mines. But, as pointed out already, the high result always differs from the low, especially in the case of the precious metals, because the former may be due to an accidental inclusion of a small particle of specimen ore or a 'metallic' in the final pulp, while the latter simply bespeaks an absence of rich ore in the whole of the sample, provided the latter has been reduced so that the assay pulp represents the average contents of the crude ore broken in the process of sampling.

In regard to talking straight to one's client, telling him whether the facts are sufficient to be the basis of an opinion or not, explaining the element of risk and taking care to distinguish between probabilities and possibilities—in all this I agree heartily with the views expressed by Mr. Packard, and, as the reader is aware, I have endeavored to emphasize the advisability of being outspoken, for business reasons, as well as from finer considerations.

The mathematical demonstrations and methods of calculation described by Mr. Blamey Stevens and by Mr. Auguste Mathez are interesting, not only because they will facilitate the arrival at conclusions, but chiefly from the fact that they illustrate the mathematical basis for the methods which men reach more laboriously through experience. Empiricism, rule of thumb, practical ways—these are all reached by a process of elimination, and, in so far as they are logical and survive the test of usage, they can be expressed in terms of mathematics.

Mr. Gemmell offers several useful hints. In deprecating "unnecessary refinement" of method he exhibits a natural impatience, for once a man is thoroughly experienced he can dispense with certain details of procedure, as a golf player who is in good form may not need to waggle his club before making a drive. But in describing all the possible precautions against error, I did so for the benefit of the novice, who, as he gains experience, will be warranted in dispensing with some of them, while retaining others, according to the circumstances of each case.

The examples quoted by Mr. Gemmell are full of suggestion; it is by contact with such facts that a man acquires the judgment which enables him to detect the weak points of any estimate, and so avoid them. No contribution to this discussion will be more valuable than these transcripts from experience as given by Mr. Gemmell, if they emphasize the enormous variety of conditions to be faced in the valuation of mines.

Impatience with an apparently needless elaboration of niceties of method has become evident in the latter part of this discussion on sampling, and a letter received from a veteran engineer voices this sentiment by suggesting that too much emphasis is being placed upon useless details, which have the effect of obscuring the essential facts.

Well, there is something to be said for that; an engineer should not get so tied up with his paraphernalia and methods as to lose sight of the purpose of it all, for, if he does that, he will resemble the centipede who got along very well on his multitudinous legs until the scorpion asked him which leg he put out first, and thereupon the centipede became so self-conscious that his extremities were all tangled up and he fell by the wayside. There is a happy medium between discarding a proper procedure and becoming the victim of it, to be so 'practical' as to neglect precautions and to be so 'technical' as to lack sense of proportion. This entire consideration of a difficult part of mining practice illustrates the importance of the personal factor. The mathematical demonstrations and occasional short-cuts, such as have been described by Messrs. Channing, Hoffman, Stevens and Mathez, are all suggestive of the fact that the methods evolved by experience, if good, are logical; but beyond this there is an insistent element present in all estimates of ore in a mine, that is, the personal equation, which cannot be expressed by any algebraic sign save x. No branch of professional work, not even the management of men, requires more resourcefulness and skill; for this reason it is considered one of the severest tests of an engineer's capacity. If, therefore, the importance of this subject has become recognized increasingly during the last few years, it is good evidence of the emergence of mining from the mists of speculation onto the firm ground of serious business.

T. A. RICKARD.

New York, Oct. 24, 1903.

LARGE COAL CARS IN GERMANY.—The carrying capacity of the average German coal car is from 10 to 15 metric tons. Recently the Vereinigte Königs- und Laurahütte received an order from the Prussian State railways for 200 cars, each of 20 metric tons capacity.

NEW COAL DISCOVERY IN LUXEMBURG.—A new soft coal basin in the province of Luxemburg, north of the city of Liège, was discovered some time ago, and extensive soundings have been made. The deposit underlies many square miles of the northern part of Belgium and the southern part of Holland. One of the veins, at a depth of from 1,000 ft. to 1,500 ft. below the surface, is from 15 ft. to 17 ft. thick, and of a very fine quality of coal. It is estimated that this new field contains more than 500,000,000 tons of a good description of coal.

A BRITISH COAL COMBINATION.—The English papers report that, after negotiations extending over twelve months, the South Wales Anthracite Amalgamation Syndicate have arrived at what is practically an arrangement of terms with 90 per cent of the South Wales anthracite mine owners. The negotiations were prolonged, owing to many owners holding out for high prices, which the syndicate declined to give. The aggregate amount of coal proved in the mines acquired is over 90,000,000 tons, and the output capacity is approximately 1,000,000 tons per annum.

NEW COAL MINES IN SCOTLAND.—The London *Colliery Guardian* reports that as the result of boring operations conducted on the estate of Tyneholm, Pencaitland, the property of Mr. James Reid, seven valuable seams of coal have been passed through at a depth of only 42 fathoms. The first two seams are each over 4 ft. in thickness—the Great Seam and the Tranent splint—of excellent quality and with a low percentage of ash. The other seams, which include the gas coal and the famous Pencaitland splint, are each over 2 ft. in thickness. It is intended to proceed at once with the sinking of two new pits, and the erection of workmen's houses. The Gifford & Garvald railway, lately opened for traffic, passes through the center of the property.

RAILROADS IN CHINA.—Some interesting particulars as to the extension of the railway systems of North China are contained in the annual report of the Commissioner of Chinese Customs in Tientsin. The Peking Syndicate are, he says, pushing on with the line to the Shan-si plateau. They will first tap the Shan-si anthracite deposits on their accessible side where they extend into Ho-nan. The projected extension of the railway up to the Shan-si plateau as far as Tsê-chou will place the terminal in the midst of one of the most notable coal and iron regions in the world. The Lu-han line will be crossed at right angles, and will share in the distribution north and south. With the close of the year came the news that the Russo-Chinese Bank had succeeded in its negotiations for the building of a railway from Cheng-ting-fu.

MINING IN THE KIRGHIZ STEPPES.

By E. Nelson Fell.

The Kirghiz steppes[1] cover a large area in the southwestern portion of Siberia, reaching from the Urals and the Caspian sea, on the west, to the Altai mountains, on the east. The Trans-Siberian railway roughly defines the northerly limits of this area, and to the south it fades away in the geographical and political mists of the old Central Asiatic khanates. In the eastern portion of this vast tract are two divisions, known respectively as Semipalatinsk and Akmolinsk. These two districts are not under the jurisdiction of the government of Siberia, but have a separate administrative system of their own, under a governor, resident at Omsk, with the title of Governor-General of the Steppes. Over the larger proportion of this area mineral has been known to exist for many years, and mining has been carried on by a few bold spirits since the first quarter of the last century. It is impossible to refrain from admiring the confidence and courage of old Stephen Popoff, who, in the early part of the nineteenth century, plunged into this unknown country, more than a thousand miles from any communication, the very name of which was a terror to most men. But he was a man of the true pioneer type, and succeeded brilliantly in the face of almost insuperable difficulties; and the works and mines which he and his descendants built remain to this day a record of his untiring energy and faith.

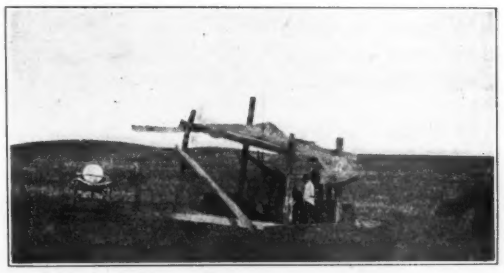
TIMBER HAULING IN WINTER, BAIANDI-KUDUK COAL MINE.

His attention was chiefly concentrated upon silver and lead deposits in the Semipalatinsk district, and in 1864 he was followed by the Riasanoffs, a wealthy family of Ekaterinburg, who investigated the copper deposits in the Akmolinsk district. This family commenced work at once on the Yuspensski mine, achieving such success that they have been working on it ever since (with occasional intervals), and are working there still. So successful were they that they did not go farther afield, but have quietly worked the mine to their great profit; so that, while the bolder schemes, and to some extent the failures, of the Popoffs have made their name and mines well known over Russia and elsewhere, the name of Riasanoff and the fame of their mines have only lately been noised abroad.

The two families had the field to themselves, and worked the mines and the ores in the prevailing primitive fashion, until, in the last decade of the nineteenth century, the rumble of the railway could be heard in the far-away north and the Kirghiz steppes became linked to the western world. Other operators and companies, notably Messrs. Perfiliev & von Rieben, and the Voskrysyensski Company, have come in since that time, but the district is so enormous and distances so great that even yet the impression is one of boundless solitudes, whose silence is only intensified by the nomad Kirghiz driving their herds and flocks from pasture to pasture.

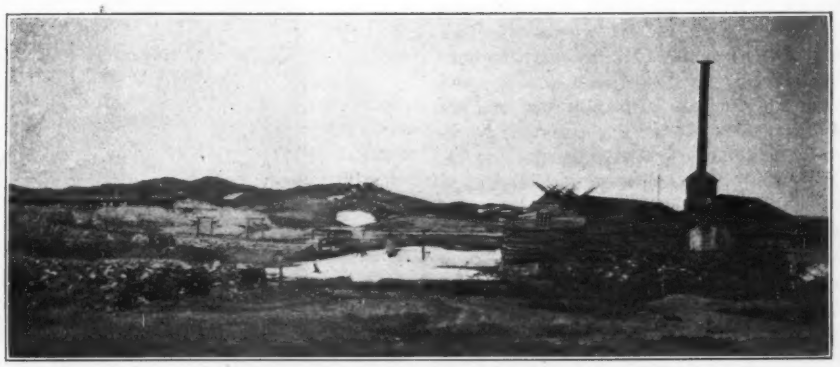
In summer the country is very attractive; from the absence of trees, the general effect is that of a prairie; but, though along the river Irtish and other rivers it is quite flat for many miles, it is elsewhere broken by undulating hills and rocky ridges, which rise from 500 to 1,000 ft. above the surrounding plain. A total absence of glaciation and a very limited amount of atmospheric denudation have combined to give these ridges a more rugged appearance than is usually the case, and hence an appearance of height which is deceptive, and, considered as scenery, very agreeable. In the neighborhood of Bayan Aool and Karkaralinsk a granite uplift has produced a series of mountains of considerable elevation and peculiar beauty. These rise to a height of about 4,000 ft., and their sides are clad with pine and birch; elsewhere there is no trace of timber or shrubs. The rock foundation is protected by a thin covering of soil, on which grows a short, nutritious grass, which keeps the large herds fat in summer and from which excellent hay is made for winter use.

The general altitude of the table-land in the neighborhood of the river Irtish is about 1,800 ft. The climate is healthful all the year round, with open weather from April to November; the summer is enjoyable, with not infrequent showers of rain and an almost total absence of insect pests; the winter is severe, very cold, with blinding blizzards; but, as the custom is to build houses with thick walls and to heat them well night and day with large brick stoves, the winter is endurable. Fortunately, nature has endowed this country with many of the necessities of life, and hence its remoteness from centers of supply is not so keenly felt. Coal, lime, clay, asbestos, magnesite, quartz and many other useful products are never far to seek, and the various bread grains, such as wheat and rye, are grown in great quantities in the Semipalatinsk district, and are everywhere cheap. The scarcity of timber is felt to some extent as a hardship, but, though dear, it can always be obtained in sufficient quantities for all purposes.



DIAMOND DRILL NEAR CHANDY MINE.

I shall only refer to the geology of that portion of the country which has come under my observation in its relation to the mineral deposits. In general, it does not seem to be complex. It consists in the main of sedimentary strata, irregularly broken at intervals by intrusions of igneous rock. The mineralized areas are always found in the neighborhood of the contact between these two classes of rocks. So far as I have observed, the intrusive rocks have not selected any definite lines of action; the effect of each one seems to be local, and is quickly superseded by its neighbor. The igneous rocks are principally basic in composition, and present all the gradations to be found in rocks of this class; they vary from crypto-crystalline and amygdaloidal to highly porphyritic types; they are frequently cut by acid dikes, the latter serving as channels for the impregnating solutions. The impregnation may take place in the dike only, or the dike may be barren and the walls impregnated, or the impregnation may be along both walls and dike. Schistose rocks are seldom seen in the Pavlodar district. The granite series is represented in the mountains of Bayan Aool and Karkaralinsk. It is coarsely crystalline and easily affected by atmospheric agencies, so that the characteristic forms which granite assumes on weathering are in these ranges exhibited in so exaggerated a manner that the scenery becomes almost theatrical in its effect. This granite appears to be of more recent date than the other igneous rocks, and there is no evidence as yet of mineralization within its boundaries. The sedimentary rocks are chiefly sandstones and conglomerates, which have been referred to the Devonian period, and limestones of the Carboniferous period. The sandstones and conglomerates pass quickly from one to the other, and the pebbles are seldom round, and often so angular that the rock rather merits the name of breccia. The rock frequently has the appearance of having been formed in a river-bed, disturbed by frequent freshets; that is to say, the texture of the conglomerate is very irregular. A fine-grained sandstone is found lying alongside of a coarsely brecciated conglomerate; the same observation applies to rock-waste of the present day. It is angular and has never traveled far. The character of the rocks can be fairly ascertained by examining the loose surface debris. There is no doubt that these sedimentary rocks have been derived from igneous rocks not far distant. To a person familiar with a glaciated country, the entire absence of any signs of glaciation are remarkable in many ways. The absence of foreign pebbles and boulders and the sharp angular ridges of rocks, and the ease with which a geological reconnaissance could be made, are all very striking results following from it. It has no doubt contributed in a marked manner toward the formation of the deep deposits of copper carbonate which are so characteristic of the steppes; and, speaking in a general way, I think it is of great importance in the economic geology of the region.



ANNENSKI SHAFT-HOUSE, YUSPENSSKI MINE.

Coal is found plentifully distributed over large

[1]Steppes are treeless table-lands, analogous to the more elevated prairies of the West.

areas in the sedimentary rocks, and is of two classes—bituminous and lignite. The coals of the former are found in both tilted and flat seams, and of the latter in flat seams. The following assays were made in our laboratory by Mr. Vans Agnew, and are fairly representative of their respective types:

	Moisture.	Volatile.	Carbon.	Ash.
Bituminous coals, Karagandy mine..	3.0	17.0	71.4	8.6
Kisiltav mine....	1.3	16.6	71.3	10.8
Lignite, Baiandi-Kuduk mine.....	12.5	30.5	49.5	7.5

The bituminous coals belong to the Carboniferous period, and the lignites to a later series.

MOUTH OF VLADIMIR SHAFT, YUSPENSSKI MINE.

For practical purposes, however, the steppes will for many years be considered only as a store-house for copper. Other minerals are found plentifully, and will be largely used locally, and on them will depend to a large extent the future of the copper industry; but for present purposes, so far as the outside world is concerned, the interesting question for years to come will be, first, the extent of the deposits, and, second, the cost of working and treatment. Therefore, in using the term 'mineralization,' I refer exclusively to mineralization by ores of copper.

Mineralization takes place in the igneous and in the sedimentary rocks, but usually near the junction of the two. It takes place in almost every form known to the textbook—as veins, as contact deposits, as alterations, and as impregnations. The latter are the most numerous class of deposits, and are found in both igneous and sedimentary rocks; in the former they may follow dikes or fault planes, and in the latter they sometimes cut across and sometimes follow the planes of bedding. In a large number of cases the impregnation has taken place along lines which it is impossible to define at present, and the origin of which is not obvious. In this district (the Pavlodar district of the Semipalatinsk division) the number and the extent of the copper-stained outcrops is extraordinary, and they can be plainly seen at a distance by the absence of the usual grasses and by the presence of certain flowers, which we have named the "copper flower." It is certainly the paradise of the prospector. Though these impregnated deposits are not usually high in grade, say from 2 to 5 per cent in copper, some of them, at least, are large in extent, and should, when their characteristics are better defined, become of great importance. So far as I have observed in this district, the deposits in the form of veins are often rich, but are inclined to be small and irregular and less worthy of attention. Some of the contact deposits, however, along the limestones give promise of opening up in a satisfactory manner. In the Akmolinsk district, however, is the famous mine, the Yuspensski, belonging to the Riasanoff family, which is a vein on the contact of slate and an acid igneous rock. This vein is not only remarkably rich, but large and regular.

The deposits commence at the surface with carbonates, azurite and malachite, frequently enriched with copper oxide and native copper, and in such cases the ore is likely to be rich. At a depth between 100 and 150 ft. the carbonates give way to sulphides; and in the only mines where work has been carried down to this depth, the predominating sulphide is bornite. Below this point is a zone of remarkable secondary enrichment, with the heavy sulphides of copper, chiefly tetrahedrite and copper glance. Such ores will commonly run up to 40 per cent in copper, and will assay 25 per cent across large areas. In the deepest mine known, the Yuspensski, the greatest depth attained is 301 ft., and at this level the richest ore in the mine has been found. To what depth this zone of remarkable enrichment will continue cannot be foretold; nor have we much indication of the composition of the chalcopyrite to be encountered eventually, as we may expect it will be, at greater depths.

Of the class of impregnated deposits we know less than of the veins, and the deepest point to which work has been carried in such a deposit is in the Little Djam Bhouldi mine, where I have lately sunk a shaft to a depth of 98 ft. in a deposit of conglomerate. In this shaft the impregnation, which covers a large area on the surface, cuts through the planes of bedding and holds a fairly uniform tenor of about 4 per cent, the best sample having been taken from the bottom of the shaft, which ran 5.3 per cent. At this point the rock is still soft and altered, and the sulphides are beginning to show themselves.

Mining was carried on in the steppes many years ago by a race preceding the Kirghiz. These works are always called Kalmuck workings, the name popularly given to the race of men who inhabited the steppes before the Kirghiz drove them out. After they left no work was done until the arrival of the Russians. These Kalmuck workings are all of the same character. They seem to have mined and filled up the excavation behind them, so that at present their traces can only be detected by a practiced eye and by trenches which reveal the old fillings. These fillings are often full of ore which will assay 10 or 12 per cent, and it is evident that this material was of no use to them, but that they were seeking the extra rich copper oxides and native metal. They could not mine below water-level, and their workings are consequently shallow, as water is nearly always encountered between 20 and 30 ft. These workings are certainly interesting, and I am at present engaged in opening a working of this kind, which is clearly traceable over a length of 2,000 ft. and a breadth of 100 to 200 ft. After the Kalmucks there was a long period of inactivity, for the Kirghiz are not miners by nature; and finally the Russians came.

At the present time, mining and smelting methods are not conceived at all on a modern basis; neither methods nor practice are those of the Western States. Trained engineers have not been placed in charge, and while it is easy to adopt a critical attitude, it must always be remembered that the men here have accomplished what they have done without any training and with very little support from their employers. They have had to do their best with the materials at hand, and without the emulation and experience which come from intercourse with men engaged in similar pursuits in other parts of the world. The industry has not, hitherto, been regarded as an investment by the wealthy men and the investing public in Russia, but has been left to a few speculative individuals who have considered mining as a side issue only and not worthy of systematic, trained supervision. Of late, however, the Mining Institute at St. Petersburg has received new life, and from what I have seen of this Institute and of the young men who are being trained there, I think that matters will before long be changed for the better.

MOUTH OF ANNENSKI SHAFT, YUSPENSSKI MINE.

Mining follows uniform lines, no matter what the character of the deposit may be. No exploration and no development is thought of, but a "glory hole" is at once commenced, whether the deposit is a large low-grade impregnation or a small rich 6-in. vein,

and from this the ore is sorted out and sent to the smelter. When the open-cut is about 30 ft. deep, a shaft is commenced, and at 30 or 40 or 50 ft. more the limit of resources is reached and the mine is abandoned. The only form of shaft-sinking known is the vertical shaft, and the only form of timbering that of close sets, log-cabin style. The result is that the shafts are seldom sunk on the ore, and when they are in ore the close timbering prevents any examination of the ore-body. Such is the condition of hundreds of mines here, or prospects, as they would be called in the West. The work done is no good, either for exploration or development; the owner knows no more as to the value of the deposit, and the visitor is unable to see any more than he could have seen at the start, and often not so much. A Russian mining man, who has spent a small fortune in this hand-to-mouth manner, and who does not to-day know anything more of his property than when he started, referred to his failures as the act of destiny. Mining, he said, was a lottery, and science and skill were of no avail.

TIMBERING IN STOPES, YUSPENSSKI MINE.

He was looking for a second Yuspensski mine, and anything less than this would have been of no good to him. Under the present system, 10 per cent ore in a 10-ft. vein is necessary to enable the work to proceed.

(To be Continued.)

A NEW ASPHALT DEPOSIT.—A deposit of asphalt rock on the Island of Bahrein, in the Red Sea, has recently been investigated by British authorities. The material on analysis shows a content of 17.67 per cent bitumen, of which 10.47 per cent is petrolene and 7.20 per cent asphaltene. Laboratory tests as to its quality for paving purposes proved satisfactory, showing that the material could be diluted up to 75 per cent with limestone. The asphalt is too low-grade to be exported to European markets, but it is thought that it could be marketed profitably in India.

UTILIZATION OF ATMOSPHERIC NITROGEN.—In a recent issue of the *Zeitschrift für Elektrochemie*, A. Frank discusses the value of various methods for fixing the nitrogen in the air, and states that experiments on a large scale show the feasibility of manufacturing nitrogenous fertilizers at a cost that compares favorably with the present prices of nitrate and ammonium sulphate. By using calcium carbide as a basis, calcium cyanamide is obtained according to the formula $CaC_2 + 2N = CaCN_2 + C$. This product, when subjected to heat and pressure in the presence of water, gives up its nitrogen in the form of ammonium, indicating that it could be used directly as a fertilizer. Exhaustive experiments conducted by Professor Wagner, of Darmstadt, and Dr. Gerlach, of Posen, proved the correctness of this conclusion, and it is stated that calcium cyanide is nearly equal to ammonium salts for fertilizing purposes.

GRINDING MACHINES USED AT KALGOORLIE.*

By W. E. Simpson.

In the Kalgoorlie district two kinds of dry-crushers are used, namely, ball-mills and Griffin mills. For wet grinding, flint mills and Huntington mills are employed.

Ball-mills have for years given every satisfaction at the Associated, Kalgurli, Hannan's Star and Boulder Main Reef mines, while the Griffin mills claim supporters at the Perseverance, South Kalgurli and Great Boulder Proprietary.

As the Great Boulder Proprietary and the Boulder Main Reef are adjacent mines, working the same lode, which is practically identical in character, chemical composition and physical properties in both cases, a comparison between the efficiency of the two crushers is possible; but comparisons of costs, other than those of general maintenance, etc., are scarcely fair, because in the larger plants power can be produced at a much lower rate per unit, and the cost of supervision, etc., is divided over the greater tonnage treated.

The Griffin mill is exceedingly neat and compact, and occupies only about one-third of the floor space of a ball-mill, but this is of small moment where economy, efficiency and profit are the chief matters to be considered.

In comparing the output of a Griffin mill with that of a ball-mill, it must be recollected that the former is fed with pieces no bigger than walnuts, while the latter will take lumps as big as the fist.

It was found on one occasion that 75 per cent of the ore fed to the ball-mills at the Boulder Main Reef was too large to pass through a 2-in. ring; indeed, 3 per cent proved too large to pass through a 6-in. ring. In spite of this, the mills were each treating 33 tons a day.

A defect of the Griffin mill is its very small screen-area. The pulverized ore is drawn through the meshes by the suction of a Sturtevant fan and is caught by cyclone arresters. It is exceedingly complicated and easily gets out of order, while it possesses the additional disadvantage that, as the pendulum must revolve at an enormous speed, the wear and tear is very great. Of the 12 Griffin mills installed on the Great Boulder Proprietary mine, never more than 10 are running at one time; the others are always under repair. The wearing parts, *i. e.*, the roll-tires and followers, costing $15.60 and $10.08 each, respectively, require renewing every eight days, while the die rings, costing $19.20 each, and the roll bodies, costing $15.12 each, last only about six or eight weeks. On the South Kalgurli the pendulum shafts are replaced on an average every two months, at a cost of about $48 for material alone. Driving-belts also suffer severely, and require to be renewed twice a year. The power required is 20 indicated h. p. per mill, and the output is 1.25 tons per hour of running.

It is now admitted generally that among the dry crushers the ball-mill has no rival as regards output, low running cost, and the excellence of its finished product for the subsequent roasting treatment. The screen-area is enormous, and amply sufficient to secure the discharge of the ore immediately it has been reduced to the required degree of fineness, and as the screens themselves revolve they are subjected to a gentle internal scouring, which keeps them clean and in proper trim for efficient working. The cost of maintenance is exceedingly moderate, one steel ball, weighing 18 lb., being put into each mill every day with the charge of ore in order to make up for the consumption of metal. The other wearing parts are the grinding plates and side-liners, which are replaced in complete sets every seven or eight months, and cost $864 delivered on the mine. The driving-belts on the Boulder Main Reef, which are of camel's hair, have now been in use continuously for over four and a half years, and look as if they would still last a long time.

Each mill makes exactly 25 revolutions per minute, requires about 24 i. h. p., and has an output of over 1½ tons per hour.

The total weight of the steel balls in each mill varies from 2,240 lb. to 2,464 pounds.

An examination of the powdered ore leaving the ball-mills on the Boulder Main Reef, where a screen of 20 holes to the linear inch is used, furnished interesting data. A sample assaying 16 dwt. per ton was treated on a series of brass-wire sieves. The portion retained on each was carefully weighed and assayed separately, with the following results:

									oz.	dwt.	gr.
		Retained on	40	-mesh	sieve		24.1%	assay.	0	7	20
Passing	40	"	60	"	"		9.4%	"	0	11	18
"	60	"	80	"	"		6.2%	"	0	13	7
"	80	"	100	"	"		6.6%	"	0	17	0
"	100	"	150	"	"		3.2%	"	0	18	7
"	150	"	200	"	"		4.2%	"	0	18	7
"	200	"	...	"	"		46.3%	"	1	0	6

It will thus be seen that as regards value the ball-mills produce only two qualities; the coarse, largely made up of hard particles of quartz, is comparatively poor, while the fine contains most of the gold, owing to the friability of the sulphides and tellurides.

The Griffin mills, even with a coarser discharge screen, yield a much finer product. For example, the Griffin mill at the Great Boulder Proprietary mine, with a 15 to 18-mesh, produces an impalpable powder, of which 75 per cent will pass through a 150-sieve. It is claimed that the extra work thrown upon the rock-breakers in preparing for the feed of the Griffin mill is compensated by a corresponding diminution of work in the Wheeler pans in the sliming section of the process; while this is admitted, to a certain extent, it cannot be denied that the very fine crushing is a distinct disadvantage for the roasting. A certain amount of grit is always advantageous, as it allows the oxidizing atmosphere to play more effectively in and about the fine sulphurous particles; while at the same time it prevents that banking into ridges, or packing, so noticeable in the treatment of the more finely grained or floury material. Actual practice shows that one 5-ft. Wheeler pan will deal with a daily output of 16.6 tons from the Griffin mills and only 12 tons from the ball-mills; but the consumption of pan shoes and dies is precisely the same, being 1.8 lb. per ton of original ore in either case.

One other point in favor of the ball-mill is that when, as not infrequently happens, a dynamite cartridge is carelessly shoveled up in the mine and sent up with the ore, its explosion does little or no damage to the ball-mill because of the great space available in which to expend its energy. This is not the case with the compact Griffin mill, where the explosion is confined and often blows the bottom to pieces. The expense incurred in repairing the results of an

*Abstract from paper entitled 'Treatment of Telluride Ores by Dry-Crushing and Roasting at Kalgoorlie, Western Australia,' Institution of Mining and Metallurgy, October, 1903.

accident of this kind amounted formerly to $192 to $336; but these figures are now considerably reduced through the substitution of false bottoms of sheet iron for the heavy castings. However, even now the cost of repairs is heavy, besides which, time is lost and the mill is lying idle while the damage is being put right.

Another type of pulverizer, much favored on this field, is the flint mill. It is a hollow revolving steel cylinder, 16 to 20 ft. in length and 4 or 5 ft. in diameter, and closed at both ends except for a small central opening in each. It is lined completely with cast-iron or steel plates ¾ to 1¼ in. thick, and when in operation is partially filled with a charge of hard flint nodules. The sand is forced from the nozzle of a spitzkasten through the central opening in the receiving end, is ground in the mill, and escapes as slime at the discharge orifice. One flint mill is sufficient for a 2,000-ton per month plant, using a 30-mesh wire screen, and the work is done so efficiently that 99 per cent., or practically the whole, of the finished product will pass through a sieve of 200 holes to the linear inch.

A complete set of liners weighs about 4 tons, lasts from 7 to 10 months, and costs $384 on the spot.

The working charge of flints ranges from 4 to 6 tons, and about 1 cwt. of flints is consumed in grinding 100 tons fine enough to pass through a wire screen with 30 holes per linear inch. Each mill consumes from 18 h. p. to 35 h. p., according to size, makes 30 revolutions per minute, and, when working efficiently, emits a low, dull note or roar easily recognized by an experienced attendant.

The function of a flint mill is to pulverize, and as such it is at present unsurpassed, while the pan (which is also used in the treatment at Kalgoorlie) has not only to grind, but also to amalgamate.

For obvious reasons the flint mill cannot be used as an amalgamator, and copper plates are decidedly objectionable in either process, for the following reasons: All the waters traveling through the Kalgoorlie plants are in reality dilute cyanide solutions; even battery waters carry from a mere trace up to 0.03 per cent of free cyanide. The amalgamating plates are consequently rapidly corroded, as, for example, those of the Hannan's Star and the Kalgurli mines, which have to be replaced every nine months, and the dissolved copper must be precipitated subsequently in the zinc-boxes. The objection therefore is twofold, the destruction of the plates themselves and the production of impure 'coppery' bullion.

In performing their duty, pans polish and brighten the metallic particles and thus promote amalgamation, but, on the other hand, flint mills tend simply to flatten them and consequently amalgamation is retarded.

In my opinion, the best results could be obtained by a combination of both these appliances—one, or perhaps two, pans to catch all the free gold and perform the rough grinding, and flint mills to complete the pulverization into an impalpable powder or slime.

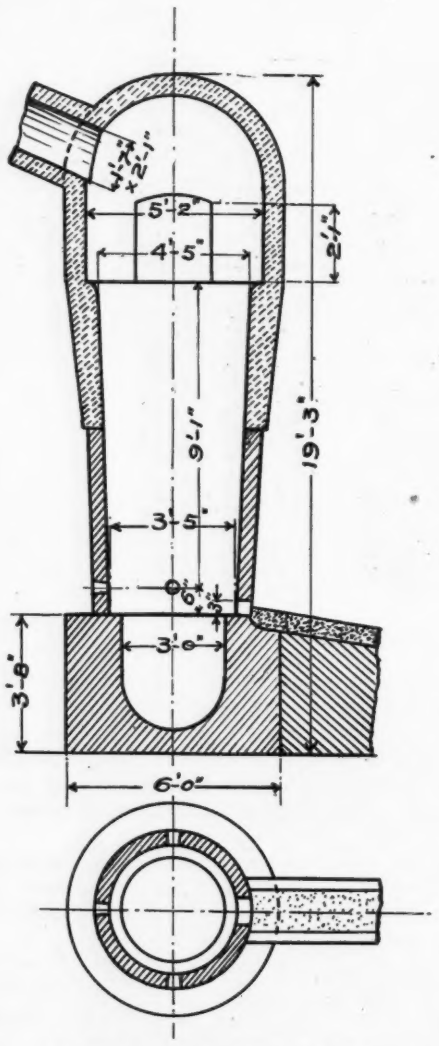
Huntington mills have been tried for pulverizing the roasted ore, but the ever-present plaster-of-paris soon encrusts and enamels all the exposed ironwork, the fine mill screens rapidly become choked, and further work is impossible.

NEW FRENCH BLAST-FURNACES.—The London *Colliery Guardian* says: "The Creusot blast-furnaces at Cette have come to a temporary check owing to defects in the machinery. The Cette establishment, of recent foundation, was less an enterprise than a necessity. The Creusot works were menaced by the gradual extinction of the iron deposits of Mazenay and the coal mines of Montchanin and Creusot. In a few years Creusot would be obliged to seek elsewhere for its supplies of coal and iron, and it became necessary to start another center. Cette is situated between the Rhône and the Midi Canals, and the Midi and Paris-Lyons-Mediterranean railways. The port of Cette will shortly be capable of receiving ships of 4,000 to 5,000 tons burden.

LEAD SMELTING IN SPAIN.

BY HJALMAR ERIKSSON.

A few notes, gathered during a couple of years while the writer was employed at one of the large lead works in the southeastern part of Spain, may perhaps be of some interest, not as showing good work, but for comparing the results obtained in modern practice with those obtained by what is probably the most primitive kind of smelting to be found to-day. The plant about to be described may serve as a general type for that country. As far as the writer knows, the exceptions are a large plant at Mazarron, fully up to date and equipped with the most modern improvements in every line; a smaller plant at Almeria, also in good shape, and the reverberatory smelting of the carbonates at Linares. It should be kept in mind, however, that the conditions



SPANISH LEAD BLAST-FURNACE.

are peculiar, iron and machinery being very expensive and manual labor very cheap.

About 4 ft. above the tuyeres the furnace is built of uncalcined brick made of a black graphitic clay found in the mines near by; the upper part is of common red brick. The entire cost of one furnace does not reach $100. The flue leads to a main gallery 3.5 by 7 ft., which goes down to the ground, and extends several times around a hill, the chimney being placed on the top of the hill, considerably above the furnace level. The gallery is about 10,000 ft. long, and is laid down in the earth, with the arched roof just emerging. It is all built of rough stone, the inside being plastered with gypsum. The furnace has three tuyeres of 3-in. diameter. The blast pressure is generally 4 to 6 in. of water. Neither feeding floor nor elevators are used, only a couple of scaffolds, the charge being lifted up gradually by hand in small convenient buckets made of sea-grass. When charging the furnace, coke is piled up in the center, and the mixture of ore, fluxes and slag is charged around the walls. The slag and matte are left to run out together on an inclined sand-bed. The matte, flowing more quickly, goes further and leaves the slag behind, but the separation thus obtained is, of course, most unsatisfactory. The charge mixture is weighed and made for each furnace every morning. When it is all put through, the furnace is run down very low, without any protecting cover on the top; several iron bars are driven through the furnace at the slag-tap level, for holding up the charge; the lead is all tapped out; a big hole is made in the crucible for the purpose of cleaning it out; all accretions are loosened with a bar; the hole is closed with mud of the graphitic clay; bars are removed, when the crucible is filled with coke from the center and the charging is continued. In this way a furnace can be kept running for any length of time, but at a great loss of heat, and with a great increase of flue-dust.

The current practice, in many parts of Spain, is to run the same number of ore-smelting and of matte-smelting furnaces. All the slag and the raw matte, produced by the ore-smelting furnaces, is re-smelted in the matte-furnaces, together with some dry silver ores. No lead at all is produced in the matte-furnaces, only a matte containing up to 150 oz. silver per ton and 25 to 35 per cent of the lead charged on them. This rich matte is calcined in kilns, and smelted together with the ore charge.

The ores we smelted were galena ranging from 5 to 83 per cent lead and about 250 oz. silver per ton of lead; dry silver ores containing up to 120 oz. silver per ton, and enough of the Linares carbonates for keeping the silver below 120 oz. per ton, in the lead. The gangue of the galena was mainly iron carbonate. Most of that ore was hand picked and of nut size. Machine concentrates with more than 30 per cent lead or containing much pyrite were calcined; everything else was smelted raw. The flux exclusively used, before the writer came, was carbonate of iron, which, by the way, was considered a 'cure-for-all.' The slag analyses showed:

CaO, below 4 per cent.
FeO, above 45 per cent.
SiO_2, about 30 per cent.
BaO, 5 to 10 per cent.
Al_2O_3, 5 to 10 per cent.
Pb, by fire assay, 0.75 to 2.5 per cent.
Ag, by fire assay, 2 to 3 oz. per ton.

The specific gravity of the slag was above 5, or practically the same as that of the matte. The output of metallic lead was about 76 per cent; of silver, 84 per cent. The working height of the furnaces—tuyere level to top of charge—was at that time only 7 ft., and the writer was told that it had been still lower before.

To the working height of the furnaces was added 2 ft., simply by putting up the charging doors that much. A very good limestone was found just outside the fence around the plant. Enough limestone was substituted for the iron carbonate, to keep the lime up to 12 per cent in the slag, reducing the FeO to below 35 per cent and the specific gravity to below four.

The results of these alterations was an increase in the output of metallic lead, from 76 to 85 per cent; of silver from 84 to 90 per cent; a comparatively good separation of slag and matte, and a slag running about 0.5 to 0.75 per cent Pb and 1.5 oz. Ag per ton.

Owing to the great extent of the gallery, and the consequent good condensation of the flue-dust, the total loss of lead and silver was much smaller than could be expected; in no case being found above 4 per cent.

The composition of the charge was 55 per cent ore and roasted matte, 13 per cent fluxes, and 32 per cent slag. Coke used was 11 per cent on charge, or 20 per cent on ore smelted. Each furnace put through 10 to 15 tons of charge, or 7 tons of ore, in 24 hours. Eight men and two boys were required for each furnace, including slag handling and making up of the charge. The cost of smelting was 17 pesetas per ton of ore, which at the usual premium (£1 = 34 pesetas = $4.85) equals $2.43. This cost is divided as follows:

Coke	$1.47
Fluxes	0.04
Labor	0.65
Coal for power	0.10
General expenses	0.17
Total	$2.43

This $2.43 per ton includes all expenses of whatever kind. The iron carbonate flux contained lead and silver, which was not paid for. The fluxes are credited for the actual value of this lead and silver. Without making this discount, the cost of flux would amount to 26c. per ton, making up the entire smelting cost to $2.65. As an explanation of the low cost of labor, it may be noted that the wages were, for the furnaceman, 2.25 pesetas, or 32c. a day; for the helpers, 1.75 pesetas, or 25c. a day.

The basis for purchasing the galena ore may here be given, reduced to ton and American money: Lead and silver are paid for according to the latest quotations for refined metals given by the *Revista Minera*, published at Cartagena. (The quotations are the actual value in Cartagena of the London quotations.)

The following discounts are made: 5 per cent for both silver and lead; $6.40 per ton on ore containing 7 per cent Pb and below; this rises gradually to a discount of $7.75 per ton of ore containing 30 per cent Pb and above.

The transportation is paid by the purchaser and amounts to about $1.20 per ton of ore.

The dry silver ores were cheaper than this and the lead carbonates much more expensive.

NOTES ON THE MICHIPICOTEN GOLD-BELT.

By C. H. Clarke.

The Michipicoten mining division, which was set apart from Crown lands by an order in Council September 9, 1897, is located on the northeast corner of Lake Superior; in shape it is a trapezoid having a length of 103 miles and width of 64, and comprises an area of about 5,000 square miles. It is bounded on the north by the latitude of 48° 30′; on the east by the meridian of Dog Lake, 84° west of Greenwich; on the south by the latitude of Cape Gargantua, 47° 36′; on the west by the shore of Lake Superior from Cape Gargantua to near Pic river. Access to the region is had by boat from the Sault Ste. Marie to Michipicoten harbor, whence a train runs to Helen mine, or to the mouth of the Michipicoten river, four miles from the harbor, from which place a good road leads to the gold district.

The shore is rugged and rises rapidly from the lake, but the rocky wall is broken occasionally by sand beaches, which form landing places for small boats. In the valleys of both the Magpie and Michipicoten rivers are sand plains and terraces, formed when the lake was at a higher level. The district has for three years been withdrawn from prospecting, except within 10 miles of Michipicoten harbor, in order to allow the Algoma Central & Hudson Bay Railway to select its land grant, but is now open to the public. The gold belt is south of Wa-Wa lake, between it and Lake Superior; is about five miles by eight, but will probably be extended when active prospecting is resumed.

The Laurentian-Huronian contact is extremely irregular, and has not been mapped, very detailed field work being necessary to accomplish this. The rocks consist of diabase, diorite, granite and dark schists. The country is well sculptured, hills and valleys, with numerous small lakes, avoiding monotony of landscape. The land is not too well timbered; spruce, balsam, tamarack, cedar and birch occur, but they are small, and 10 cords to an acre is an average cut. North of Wa-Wa lake the timber has been burned off as far as the Canadian Pacific Railway, 40 miles away.

The veins run approximately north and south, reaching up to the shore of Wa-Wa lake, and whether they continue north beyond the Helen iron mine is unknown, for the sand plains cover the rocks and prevent prospecting. Some work has been done near the Canadian Pacific Railway, and also about 20 miles south, where outcrops occur.

There is frequently a marked relation between the veins and the topography of the country, for they are often found along ravines, and, consequently, are easily traced for considerable distances. Not enough work has been done to know the vein peculiarities of the region, the greatest depth being but 350 ft., but throws into the hanging wall are known, also pinches, both vertically and laterally. In either case of pinching the vein can be recovered again by following seams in the rock. Occasionally, too, they are cut by dikes of dark schist, but are not displaced thereby. The veins are from 4 to 12 ft. in width, and carry from $10 to $12 per ton, although one shaft has been sampled by a competent engineer, yielding an average of $18. The country rock carries small values, and a large mill could treat some of the material which now goes to the waste dump. In places the quartz merges into the surrounding wall by replacement, and gives the appearance of frozen veins; at other places smooth, well-defined walls are found, calcite and ankerite sometimes occurring between the vein and country rock.

The quartz has a blue tint whenever high values are found, a striking illustration of which was met while assaying ores of this district. The flux used was yellow, and when, on mixing the charge, a green tint appeared, a high assay could be predicted.

The concentrates (about 3 per cent of the ore) consist of pyrite, pyrrhotite and marcasite, with small quantities of copper and arsenic, and carry good values. The gold is unevenly distributed in the vein, and varies in size from flour to grains, small nuggets being found in the mortar at clean-up. The superintendent of one mine informs me that in one part of his mine he can pick out a ton of rock that will yield a couple of thousand dollars.

As illustrating the remarkable richness in spots, it might be mentioned that a skeptical investor had a fresh shot put in the breast of a drift, picked out a lump of ore that weighed 41 lb., had it crushed to pass a 2-in. ring, all lumps which showed free gold removed, the balance crushed, panned, and concentrates smelted. This gave $1,800 per ton on the original 41 lb. This high figure was reached, not by the value of the concentrates, but by reason of fine gold in the quartz, which was invisible. This irregular distribution of values requires the exercise of care in milling, and an effort is made (at one property) to maintain a uniform tenor of ore by running-in low-grade material when the very rich goes to the mill. The gold amalgamates readily and the amalgam sticks wherever it forms, even on the wedges which hold the lip-plate in place. Having noticed that, where iron and copper were in contact, amalgam was formed abundantly, it was proposed to suspend a strip of sheet iron with long, narrow teeth, across the plate with the tips of the teeth just touching the copper, but, owing to pressure of other matters incidental to starting up a mill, the experiment was abandoned before a definite conclusion was reached as to the advantage to be derived, or if any injurious galvanic action occurred. Slight amounts of sericite are found in the rock, which, meeting a drop of oil from the drills, form a pasty mass, clogging the plates, and forming nodules in the mortar which enclose amalgam, and necessitate careful handling at clean-up.

Wood is used as fuel, but some other source of power will eventually be required. Plans have been made for the development of the water power of the Magpie and Michipicoten rivers, but so far they have not been carried out, though there is no doubt such a project would be profitable. The country abounds in small lakes, many of them connected by streams, so that, if any number of mills are started, some of them will have trouble with tailings in the boilers. The district is characterized by a large number of small claims in the hands of individual holders, each waiting for some one else to proceed with development and demonstrate the value of the country, so that they can secure funds to prosecute work. Altogether there are 1,500 claims registered, some of which, of course, are worthless, but others, it is hoped, will atone for them.

Some years ago a small mill of two 1,300-lb. stamps was erected, but it has passed out of commission. It was put up when the country was new and all costs were high, it was in a poor position, and there was constant friction between the manager and his men. The boom was on. Labor being scarce, a man, if reproved, would leave and find instant employment elsewhere; as likely as not his companions would strike, and to add to the trouble the owner was on the spot and would compel reinstatement of the offender in order that operations should continue. So the mill was shut down, after a brief run, which included such pleasantries as blocking the pumps, plugging the tailings discharge, feeding grease into the mortar, and putting water into the brick mold just before the bullion was poured. It is to be regretted that this mill started, for one such failure has an undue depressing effect in retarding the growth of a region. At present, work is hampered by several features, which will right themselves in time. Lack of winter navigation requires all supplies to be brought in by boat during the summer. This will be remedied when the Algoma Central & Hudson Bay Railway is completed north to the Canadian Pacific and south to Sault Ste. Marie. The unpleasant trip by stage in winter causes an annual exodus of men by the last boats in the fall from a country which, at its best, has but a scanty labor supply. Then, too, the country is not self-supporting; provisions, clothing, machinery, everything must be brought in from Ontario at considerable expense. A few attempts at farming have been made, but they were desultory, in odd times spared from mining, and have done but little else than keep the owners in provisions. A good summer road is needed from Wa-Wa Station, on the Algoma Central, to the gold region. The winter road is fair, but it is impassable in summer; and yet machinery is brought in this way, being unloaded from the boat on to the cars at Michipicoten harbor. A dock has been built at the mouth of the Michipicoten river, whence a good road leads to the gold-fields, but, as it is exposed to the full sweep of storms on Lake Superior, a short life is predicted for it. This company has suffered from the placer reports, which circulated soon after gold was discovered. The alleged nuggets were gathered from the Dickinson claim at Wa-Wa lake, the first location in the district. It is true that after a storm on the lake a slight amount of gold, which has been washed from this claim, can be panned from the sand on the beach. On this slight foundation of fact, absurd stories of the richness of the field gained credence, being helped by interested parties, and caused much distress to the disappointed host that flocked into the region. I am informed, on credible authority, that the party who started placer stories also originated reports of discoveries of quicksilver and petroleum. It is a pity there is no legal punishment for such rogues who cause pecuniary loss, want and suffering to many people, and bring discredit and distrust to the region they thus defame.

This district is not a bonanza, but gold is there awaiting extraction. The people are land-poor; there are about 200 claim-holders and 1,500 registered claims, and so far it has been a difficult matter to secure sufficient funds to perform the assessment work, let alone active development.

The Grace and Manxman mines each have 10 stamps, with provision for 20 more in the latter. The Grace has been running for nearly a year, and it has been a source of profit to its owners. The Manxman is a low-grade property, and whether it can be made to pay—it is said to yield $6 on the plates—has yet to be demonstrated. Active work is prosecuted on the Mariposa, Sunrise and Kitchi-Gammi claims. The Mariposa has a shaft 135 ft. deep sunk in the footwall, with two cross-cuts to the vein, which is 5 ft. wide at the surface, and 10 ft. at the 100-ft. level. It is equipped with a three-drill

air compressor, steam hoist and pumps; plans are being made for a stamp mill next year.

The Sunrise has a vein 5 ft. wide, with a gentle dip; the shaft, which is 112 ft. deep, being but 30 ft. from the surface at the foot. The Kitchi-Gammi has two shafts, one 110 ft. deep, the other 182 ft.; in the latter, at 145 ft., the owners have done 93 ft. of drifting, and 500 tons from this claim, put through the Manxman mill, gave satisfactory results. The Mona group of five claims has an excellent water-power, as the Firesand river runs through the center of the group with a fall of 50 ft. This vein is at a greenstone diorite contact, is 10 ft. wide, has been stripped for 200 ft. on the surface, and a test pit 7 by 8 by 15 ft. sunk. The Jubilee and Cora claims have each about 75 ft. of sinking done, but work is suspended for want of capital. In addition to these claims there has recently been reported a discovery of a dike of quartz, said to be 50 ft. wide, and 15 assays made from samples taken right across the dike gave $5 per ton. It has been staked for two miles.

THE IRON MINES OF ANGAT, PHILIPPINE ISLANDS.*

By H. D. McCaskey.

The iron deposits of Angat are situated in the province of Bulacan, central Luzon. The boundaries of Bulacan adjoin those of Nueva Ecija on the north and northeast, Infanta on the east, Rizal on the south, Manila bay on the south and southwest, and Pampanga on the west. The eastern boundary is part of the crest of the great cordillera of Luzon, while a portion of the western boundary is formed by a pronounced depression lying between the cordillera and the Zambales range. In general, therefore, the surface of the country slopes toward the east, although the rainfall in the mountains and foothills is drained by the rivers toward the west.

ORE-BED AT OLD HISON MINE.

Very little geological work has been done in the area under discussion, and most of the available information is found in various pamphlets, monographs and records written by Spanish engineers and foreign travelers. In the south-central portion of the province there are heavy beds of volcanic tuffs of, evidently, recent origin. The northern limit of the tuff deposit is at San Ildefonso, and the eastern limit curves from a point about half-way between San Rafael and Angat, southeast to San Jose del Monte, and thence extends in the direction of the island of Talin in the Laguna de Bay. Bordering this volcanic deposit on the one side is a belt of alluvium, which forms the flood-plain of the Rio Grande de Pampanda, while on the other side there are limestones of late Tertiary or Quaternary age which extend into the foothills. Within the mountainous region there is an area of crystalline rocks, some of which appear to be of igneous nature, although their exact composition has not been tested microscopically or by chemical analysis. The surface of the country is everywhere formed of heavy deposits of laterite or decomposed materials, and outcrops are seldom found.

The mineral industry of the province at present is confined to the mining and smelting of iron ore, the washing of sands of the mountain streams for gold, and lime-burning. These industries are carried on in a very small way, and they form an insignificant portion of the productive activity of the province. The history of iron mining, so far as it can be traced in the old Spanish records, indicates that the scope of the industry at one time was much broader than it is now. This conclusion is also supported by traditions current among the natives and by evidences of abandoned pits, charcoal ovens and slag-dumps on the hills and mountain sides. Ruins of houses of the early ironmasters are also seen, and various utensils made of cast iron are still in use among the inhabitants of Angat and other towns. A former Spanish inspector of mines states that in the beginning of the last century an attempt was made to establish a large plant in the Philippines for the reduction of native ores and for manufacturing the iron into various articles, but for some reason the enterprise failed.

ORE-BED AT THE OTAYCO, OR CONSTANCIA, MINE.

The deposits in general lie within the area of crystalline rocks on the western flanks of the cordillera, there being, so far as known, no occurrence of iron on the eastern side of the range. The workings, where observed, consist of shallow pits from 6 to 30 ft. deep, extending through the overlying burden of clay. There are no underground workings, and, indeed, it may be added that a large part of the ore smelted in the past came from boulders of hematite and magnetite found in the beds of mountain streams. The open-cuts and trenches formerly used for the extraction of ore have been filled and are overgrown with forest, while the present limited workings are so completely surrounded with dense jungle that little can be learned as to the extent or continuity of the ore-bodies.

After visiting and inspecting the isolated workings, I am inclined to believe that they are all situated on a more or less continuous bed or series of beds. The country rock is of massive appearance, and observations show that the dips and strikes are variable, as would be expected in a highly contorted, stratified rock. It is safe to prophesy that when the stratified formations are found in place, they will show the effects of disturbance with the same variations in dip and strike as the iron beds.

On the banks of the Monta Muro creek, at Sapang-Munti, there is a bed of magnetite of extremely irregular form. The bed is from 3 ft. 6 in. to 8 ft. thick and appears to occupy a nearly vertical position. The gangue is pyrite and serpentine and forms bands through the bed. The country rock is a crystalline slate which seems to be of igneous origin, possibly an altered diabase.

*Abstracted from 'Report on a Geological Reconnoissance of the Iron Region of Angat, Bulacan,' by H. D. McCaskey. *Bulletin No.* 3, The Mining Bureau, Manila, P. I.

Near a little creek called Sapang-Tibagan, which enters the Maon, is the Constancia claim, where two pits have been sunk to reach the ore-bed. The ore is hematite and magnetite, and is quite free from pyrite. Above the bed there is a variable thickness of clay, formed by the decomposition of crystalline rocks, the lower portion of which is composed of foliated green talc. The ore-body, so far as exposed, is from 5 to 6 ft. thick, while the entire width of the ore and talc rock may be estimated as from 16 to 18 feet.

The present and old workings of the Hison mine are uncovered by a small stream flowing eastward to the Maon. This stream is called the Tusig, and its rocky course is the only thoroughfare to the outcrop; the problem of transportation, it may be noted, here, as elsewhere, is a serious one, although it could be solved, doubtless, by the construction of an aerial tramway. In the stream-bed are found great boulders of hematite weighing many tons, a phenomenon that accounts for the small amount of development work that has been done upon the ore-deposits, as the iron workers, finding sufficient ore for their limited needs so readily at hand, have naturally neglected the deposits. The Hison ore-body is from 35 to 50 ft. thick—in fact, the natives say with some reason that the mountain is iron; and although the upper layers are mixed with pyrite and steatite, the lower part, from 12 to 15 ft. thick, is formed of compact micaceous hematite with apparently no foreign mineral.

The workings of the Santa Lutgarda mine are situated on the side of Pinugayan hill and consist of two pits sunk for about 12 ft. through the overlying clay. The upper pit is merely the remnant of an ancient working, while the lower pit exposes an irregular bed about 10 ft. thick, which lies nearly vertical, and carries some steatite and serpentine. The ore is magnetite and hematite, both compact and massive, with little or no pyrite. This has long been considered one of the purest iron ores in the Philippines.

The remaining workings of the Angat district have long since been abandoned, and visits to some of them merely reveal evidences of pits now filled in with soil and alluvium. As to the extent of the beds that are exposed, I am inclined to believe it considerable, and venture the opinion that the ores are worthy the exploration essential for a proper computation of their value. There are many factors that need to be carefully estimated, before active work of exploitation is undertaken; such factors are means and costs of transportation, the market for iron in the Philippines, and the cost of importing and erecting mining machinery, smelting furnaces and other necessary plant.

The accompanying illustrations are selected from a number of excellent photographs which accompany the report. Fig. 1 shows the face of the ore-bed at the Otayo, or Constancia, mine, and Fig. 2 the ore-bed at the old Hison mine. Fig. 3 illustrates some of the difficulties which attend prospecting in this tropical country; it shows the so-called 'trail' up a branch of the Maon creek to the Hison mine. If this is the condition of the trails, it is no wonder that in some places the surveying parties had to be contented with a progress of two or three miles a day.

IRON INDUSTRY OF THE URALS.—The Russian Government has granted a concession for the construction of a railroad from Neviansk, on the Perm Railway, between Ekaterinburg and Tagilsk, to Tabarinskoje, on the Twoda river. The line, as proposed, is some 200 miles long, reaching into the great forest region north of Tiumen, and will thus serve for the transport of charcoal to the Ural iron furnaces. Russian authorities have estimated that the Ural district is capable of producing 4,000,000 tons of ore annually for a period of 200 years, and that to supply fuel for smelting this quantity a forest reserve of 40,000,000 acres is required.

ELECTROLYTIC PRODUCTION OF VANADIUM AND VANADIUM ALLOYS.

At the Fifth International Congress of Chemistry, recently held at Berlin, M. Gustave Gin, the well-known French electro-metallurgist, presented a paper upon the Electrolytic Manufacture of Vanadium and Its Alloys, which may possess some interest for our readers. A translation of this paper, for which we are indebted to Mr. F. A. J. Fitzgerald, is as follows:

The principle of the process is based upon the high electrical conductivity of vanadium trioxide, and upon the ease with which vanadium trifluoride may be obtained, by attacking the trioxide with fluorine in presence of carbon.

In order to demonstrate how these characteristic properties may be utilized, we will suppose that ferrous fluoride is electrolyzed in a solution of fused calcium fluoride; that use is made of an agglomerated anode formed by an intimate mixture of vanadium trioxide and carbon; a bath of metallic iron constituting the cathode.

The ferrous fluoride being decomposed by the electric current, the fluorine set free at the anode attacks the vanadium trioxide, which in turn gives up

PART OF THE "TRAIL" LEADING TO HISON MINE.

its oxygen to the carbon; meanwhile vanadium trifluoride is formed, according to the equation:

$$6F + V_2O_3 + 3C = 2VF_3 + 3CO.$$

The vanadium fluoride thus formed enters into solution in the calcium fluoride, and is electrolyzed in turn. The vanadium liberated combines with the metallic iron at the cathode, and the fluorine, set free at the anode, forms a new quantity of vanadium fluoride, which is electrolyzed in turn, so that the ferrous fluoride mentioned above merely serves to facilitate the operation, and to furnish the fluorine which acts as a carrier of the vanadium from anode to cathode.

This having been explained, we may now consider how it operates in practice. The vanadium trioxide is prepared by calcining vanadic acid in presence of carbon, then mixing with a suitable proportion of retort carbon and pulverized pitch, and working up hot into a homogeneous and plastic mass. After agglomeration in a special kneading machine, heated externally, the paste passes into a heavy steel mill, where it is ground. The resulting product is fed into a stamp-mill, and afterward forced through a die, the process being similar to that employed in the manufacture of carbon electrodes. Prismatic or cylindrical masses are finally produced, and these are then baked, out of contact with air, in suitable furnaces where a high temperature may be attained. Until required, the manufactured electrodes are kept from contact with air and moisture by embedding in dry pulverized material.

The manufacture of these electrodes was studied in conjunction with Dr. Paul Gans, who supplied the vanadic acid necessary for the experiments. The resistivity of the electrodes was measured at the Laboratoire Centrale d'Electricité, of Paris, with the assistance of MM. Chaumat, Delon and Petitalot, and found to equal 13,700 microhm-centimeters, at 15° C Electrodes made as explained above can apparently stand a current density equal to seven-tenths of that which could be used with carbon electrodes of the same section.

The anode of the furnace consists of a group of electrodes manufactured in the manner described; the cathode is formed by a steel block. On account of the high fusion point of vanadium and its rich alloys, certain conditions must be fulfilled. For alloys containing more than 25 per cent vanadium, the cathodic section should be considerably less than the active surface of the anode. A good yield and a sufficiently fluid bath is obtained with an average current density of 2 amperes per sq. cm. of anode section, and 6 amperes per sq. cm. of cathode, the voltage lying between 11 and 12 volts.

As has been stated, the ferrous fluoride introduced into the bath at the beginning only serves to facilitate electrolysis. Nevertheless, as there is a certain loss of fluorine by transformation into gaseous carbon tetrafluoride, by contact with the excess carbon in the mixture constituting the anode, it is desirable to compensate for this loss by adding from time to time a certain amount of ferrous fluoride.

The iron constituting the bath is introduced in the metallic state, and in small quantities at a time, after each pouring of ferro-vanadium. If no iron is introduced into the bath almost pure vanadium may be obtained, but in this case pouring becomes extremely difficult, and the metal must be extracted from the furnace in the solid state.

It is quite probable that this process will be applied under identical conditions to the industrial manufacture of alloys of vanadium with other metals, such as copper, aluminum, manganese, etc. In each case it is only necessary to replace the cathodic bath of iron with a bath of the metal desired in the alloy.

GRADE OF BROKEN HILL LEAD ORE.

According to the report of the South Broken Hill Company for the six months ended June 30, 1903, there was mined 66,886 tons of ore, which averaged 15.96 per cent lead, 16.95 per cent zinc and 8.45 oz. silver per ton, against 17.72 per cent lead, 15.73 per cent zinc and 7.46 oz. silver in the previous half-year. There was dressed 66,743 tons of crude ore and 14,500 tons of old tailings, a total of 81,243 tons, the cost of milling being 3s. 8d. (88.9c.) per ton. The production of concentrates was 13,445 tons, which assayed 67.4 per cent lead, 7.83 per cent zinc and 22.45 oz. silver per ton, showing a recovery of 66.57 per cent of the lead, 7.1 per cent of the zinc and 48.9 per cent of the silver in the ore milled, which was a falling off from the previous half-year, during which the lead recovery was 70.42 per cent and the silver recovery 53.95 per cent. The South Broken Hill Company has stacked, on the surface, tailings and slimes-heaps, of which there is estimated to be 457,298 tons of tailings, assaying 7.7 per cent lead, 19.9 per cent zinc and 3.7 oz. silver, and of slimes 78,467 tons, assaying 15.1 per cent lead, 18.3 per cent zinc and 6.2 oz. silver.

COAL IN AFGHANISTAN.—Dispatches from Peshawar, India, state that a coal deposit has been discovered at Koororkh, in the Jagdalak mountains, by employees of the Ameer of Afghanistan, who have sent to Kabul many camel-loads of coal which, after being subjected to various tests, was found to be particularly useful for fuel in workshops. A number of expert miners and four companies of sappers and miners, under the command of a colonel, with 400 camels, have been sent to the scene of the discovery.

CYANIDE PRACTICE AT THE YMIR.*

By E. C. HOLDEN.

The ore is obtained from a fissure-vein of steep dip, occurring in a slate country. The ore-body is lenticular in plan, swelling from 4 ft. to a maximum of 42 ft., and tapering irregularly to less than 18 inches. In the wider parts of the fissure the ore is mixed with portions of the inclosing rock. The clean ore is white, massive quartz, with from 8 to 12 per cent of sulphides; mainly pyrite, sphalerite and galena. The association of the precious metals is variable, the gold being mostly with the pyrite, the silver with the galena. All of the present mill-supply comes practically from below the oxidized zone.

The unavoidable admixture of rock with ore affects the character of the mill-feed, which contains sometimes from 10 to 25 per cent of slate. During the last three months of 1902 the mill-feed carried 0.3977 oz. gold and 1.903 oz. silver per ton of 2,000 lb., 2.65 per cent lead and 2.92 per cent zinc.

The Ymir mill and mine have been fully described elsewhere;[1] suffice it to say that the crushed ore, which will pass a 2-in. grizzly, is fed into 16 five-stamp batteries. The mortars are narrow; the stamps average 850 lb. and drop 6.5 in. from 98 to 100 times per minute. The height of issue is from 3.5 to 5 in., and the screens (diagonal slot) are No. 9 or 11, depending upon the height of issue. The crushing capacity is 2.5 to 3 tons per stamp per 24 hours. There are no inside plates, and but one 56 by 144-in. apron-plate to each mortar. The saving on the plates was 61.9 per cent of the gold and 9.4 per cent of the silver.

The plate-tails from each ten stamps were, without classification, put over three Frue vanners. A slightly variable concentrate was made, averaging 20.6 per cent lead, 1.17 oz. gold and 12.5 oz. silver per ton, and approximately zinc 12.9, iron 23, and insoluble 6 per cent. There was an extra smelting charge on zinc in excess of 8 per cent, and it was a delicate matter to determine how high the grade of the vanner-tails could be raised with profit, so as to throw over the zinc and reduce the concentrate tonnage. The gold saving in the concentrates was 16, the silver 35.4, and the lead 42 per cent. The total saving in the stamp mill was thus 77.9 per cent of the gold and 44.8 of the silver. These totals were higher before the tailings-plant was installed, when both battery and vanner work were necessarily closer.

The vanner-tailings during the quarter ending January, 1903, assayed 0.0882 oz. gold and 1.051 oz. silver per ton; lead, 1.3, and zinc, 2.2 per cent. Of this material, 65 per cent would pass a 100-mesh screen.

The vanner-tailings being of comparatively low grade, I felt myself practically confined to the adoption of the system of direct filling and percolation; and, as slimes-treatment was not at the same time to be provided for, the object was to treat as large a proportion of the slimes as possible with the sands; or, in other words, to make charges having the lowest practicable rate of percolation. This minimum rate is usually stated at 2 in. per hour.

It is also a current conception that a much larger proportion of slimes can be handled in an intermediately-settled charge than in a directly-filled one. To determine whether this possible difference in tonnage was important enough to justify the increased cost of installation and operation of a plant with settling-vats was an important problem, which our experimental plant decided.

After the usual laboratory tests, the experimental plant, consisting of two 35-ton leachers, 5 ft. deep, with solution tanks, zinc-boxes, etc., was erected. One leacher was charged direct from a Butters distributor, which was fed by the bottom discharge of a pointed box carrying the vanner-tailings from 20 stamps. The box got rid of excess water and a little of the finest slimes. The second leacher was charged from a two-compartment box in which the vanner-tailings were settled, the sands being dropped from the compartments alternately as filled, and shoveled in the leacher as in ordinary intermediate filling-plants. We were thus enabled to compare results of the two systems of filling with the same character of material. A comparison of results from 52 charges is here given, screen-tests being 100-mesh:

Charged.	Fines. Per cent.	Gold recovery. Per cent.	Silver recovery. Per cent.
Direct	44.2	76.5	52.2
Intermediate	39.8	77.2	54.1

The average minimum rate of percolation in the direct-filled charge was 1.9 in. per hour. In the intermediately-filled charges the rate was quite variable, but the average minimum was over 3.25 in.

Owing to structural difficulties in the experimental plant, which had to be squeezed into an unoccupied corner of the stamp-mill, we could not give the settling-boxes area enough to settle regularly, charges carrying the same proportion of fines as the direct-filled ones; but eight of these charges, made when some of the stamps were hung up, carried 43.7 per cent fines, and the gold and silver recoveries averaged, respectively, 73.6 per cent and 46.5 per cent.

These results led to the rather unexpected conclusion that direct filling, when properly done, not only leaves a charge in as good condition for treatment as the intermediate method, but renders it possible to treat a larger proportion of the slimes. It may be suggested as an explanation that in a charge settled under water the grains of sand are free to arrange themselves most compactly, with a minimum of voids, and the slimes are held near where they originally settled, because the interstitial currents are not marked enough to disturb them; whereas, in charges shoveled into a vat with less than 15 per cent of moisture, the voids are a maximum, and the slimes which originally coated each grain of sand are washed off and settle through the charge, and, thus segregating, prevent uniform percolation. The fact that direct-filled charges never pack or settle more than 1 per cent, while indirect ones frequently contract over 10 per cent, during treatment, tends to confirm this view.

The final plant is placed half a mile from the stamp-mill and 300 ft. vertically below it. The vanner-tailings are carried to the plant by a box-launder 6 by 8 in. in section, and the excess of battery and vanner-waters allows of a minimum grade of slightly under 5 per cent. At that grade, and with 1-in. riffles set 5 in. apart in the bottom of the box, the durability even of the local soft hemlock and cedar lumber is quite satisfactory.

To make the required fall of 300 ft., a series of drop-boxes is inserted where the topography is favorable; and a 12-in. sand-pocket at the bottom of each drop, to prevent wear, should also be an efficient saver of escaping amalgam or mercury.

The tailings enter the top of the storage-solution room, and when, as in the period under consideration, from 40 to 60 stamps are running, the classification is done in two boxes, the first being 18 by 24 in. wide by 18 in. deep, with two vertical sides and false ends sloping 60° to a 0.5 by 24-in. slot, under which hydraulic currents can be applied. This box settles only the coarse sands, which are drawn off through a 2-in. nipple into the charging-launder. The second box is pointed, 3 ft. 6 in. in width and depth, and 7 ft. long, with a 3-in. outlet. A plug-valve in this outlet, in combination with the hydraulic current in the box, regulates the speed of the distributors, while maintaining the same separating action in the box. The overflow from this box, carrying about 60 per cent of the water and 20 per cent of the total tailings, is run to waste. This overflow should all pass a 100-mesh screen, and is mostly impalpable material.

All of the vats and tanks, except the sumps, are of steel. The leachers, 32 ft. in diameter by 6 ft deep, are on timber foundations with masonry footings. Caps and sills are parallel, an arrangement which renders jacking-up easier than the usual right-angled structure. Bents and posts are spaced 4 ft. between centers, and the bracing does not extend above the post, the shimming being done between posts and caps. On the caps are 4-by-8-in. joists, spaced 18 in. between centers. There is no flooring on any of the vat or tank-joists, and there is headroom under them all, so that leakages occurring in the plant cannot be unknown or inaccessible. The vats are fitted with top annular-overflow launders; and, to preserve a level rim, a soft-wood strip, projecting above the edge of the vat, is fastened with stove-bolts to the side-plates, the joint being calked with oakum. Any settling of the vats which is insufficient to require jacking-up from below can thus be easily rectified, just as with tongue-topped wooden vats.

The distributors are of the usual type, and have twenty 1.5-in. arms. This area of discharge-openings, without quantity of tailings, never allowing any head to accumulate in the distributor-hopper, renders uniform distribution difficult. The slightest throw of the stream from the charging drop-box off the center of the hopper results in uneven charging, most of the slimes going to the low side of the vat. Many devices were tried to remedy this, and to prevent twisting of the drop-stream, which motion also has a classifying effect; and the last and simplest plan was successful. The drop was made square, and inside the lower end of it an iron strip was fastened to each side. The square drop prevents twisting, and to throw the stream toward the low side of the charge small wedges were driven under the iron strips, as needed.

Where there is enough headroom to give distributor arms 3-in. grade per ft., arms of 1-in. diameter, or even smaller, could be used without danger of clogging. This would be an improvement upon the usual form, which has 1.5-in. arms at 1.5-in. grade, for it would approach the ideal conditions requiring a maximum number of arms fed from a full hopper.

Continuous, uniform charging is essential to make a good charge, hence, so far as possible, stamp-mill hang-ups were made between charges. When, however, an emergency hang-up was made with a charge incomplete, a gentle hydraulic current was started under the filter in the vat; the water-feed to the distributor was increased, and when charging was recommenced the settlers were run with a strong hydraulic current for a few minutes, allowing only the coarse sands to settle. Despite every precaution, however, a slime-layer will mark in the charge every mill hang-up of over ten minutes' duration.

The classification of values in charges and overflows was marked, the average assays and screen-tests for the year being:

	Au. Oz. per ton.	Ag. Oz. per ton.	Through 100-mesh. Per cent.
Vanner-tails ..	0.0838	1.008	64.86
Charges	0.0931	0.637	50.70
Overflows	0.0621	1.878	98.90

The high silver in the overflow is due to its association with galena in the slimes.

The system of classification, it must be admitted, was crude; and if the plant were pushed to its full capacity, close hydraulic classification, yielding a clean, quick-percolating charge, would be necessary; but, as run at this time, the system was very satisfactory, for it settled and treated a total of 70.1 per cent of the vanner-tailings. When we were treating oxidized ore, charges could not be successfully treated that carried over 45 per cent of fines.

With all the stamps dropping, a vat was filled in from 28 to 32 hours; but during the last quarter of 1902 it required from 48 to 60 hours. The experimental work called for 5 days' treatment; but, with the reduced crushing we increased the proportion of slimes settled, and treated charges as long as our capacity allowed—the average time of treatment

*Abstract from a paper, 'The Cyanide Plant and Practice at the Ymir Mine, West Kootenay, British Columbia.' By Edwin C. Holden, New York City. *Transactions* of the American Institute of Mining Engineers.

[1]*Journal of the Canadian Mining Institute*, 1900. 'The Ymir Mine and its Mill Practice,' by S. S. Fowler.

being 10.5 days. A normal charge was 185 tons, dry weight.

The acid tests seem, in the case of the Ymir tailings, to be worthless as indicators for the use of lime. The ordinary tests for latent acidity called for over one pound of lime per ton. Phenolphthalein indicated more. We used 200 lb. to the charge for a while, until the zinc-boxes grew so foul that dried precipitates assayed under 1,200 oz. of total fine bullion per ton. The methyl-orange indicator was more satisfactory. It called for less than 0.5 lb. of lime per ton. But the final practice, which gave the best results, was to use less than 0.1 lb. per ton, and apply it in 5-lb. lots, the last lot going on with the final dose of strong solution. The cyanide-consumption was thus reduced over 10 per cent, and the zinc-box crude precipitates rose in grade to over 5,300 oz. per ton. In treatment, the final filtrates became very cloudy when they titrated between 0.1 and 0.05 per cent KCN; and the small addition of lime, just before starting weak treatment, tended to keep the slimes coagulated and the filtrates clearer.

Vacuum-percolation was soon discarded, as it gave a very dirty filtrate and packed the charges, so that the final rate of percolation was slower, even with the vacuum, than it would have been if unassisted throughout.

The routine of treatment was as follows:

After leveling and adding dry lime, two 5-ton doses of weak solution (between 0.1 and 0.05 per cent KCN) are successively given. When these have disappeared they are followed by four or five 10-ton doses of strong solution (0.2 per cent) at 5-hour intervals. There is no trace of cyanide in the filtrate for six hours after the first application of weak solution, and there are no values until after 15 hours. After 40 or 50 tons of strong treatment, the charge is drained 6 hours, when the filtrate has almost ceased, and titrates 0.04 to 0.07 per cent KCN. Twenty tons of strong solution are now run in under the filter. It requires from 6 to 8 hours to run this in without channeling the charge, and when it is all in, if drainage has been sufficient, there will not be more than 5 in. of solution on top of the charge. After soaking from 3 to 6 hours, the charge is drained, and a 10-ton top-treatment follows. Top and bottom treatments thus alternate until 160 tons of strong solution have been applied. Then follows weak treatment, applied on top in 5-ton doses as rapidly as it disappears, to a total of 40 or 50 tons. This is followed by wash-solution (0.05 per cent to trace KCN), 40 tons; and this by water as required, to preserve the balance of solutions or secure low end-filtrates. No solution is run to waste, other than what is lost as moisture in the residues.

The adoption of bottom treatment had a marked effect. During the first 6 months' operating, when only top treatment was used, the gold extraction gradually fell off from 70 to less than 50 per cent, and assays from the bottom of the charges were discouraging. When the connections for bottom treatment were made in October, the gold extraction rose at once from 48 per cent in September to 75 for October; and the average actual gold recovery for the last quarter of the year was 80.23 per cent, while the actual silver recovery also rose from 25 to 41 per cent.

The total time of treatment was from 9.5 to 11.5 days. The average rate of percolation was 1 in. per hour, although 64 and 71 per cent gold extraction were obtained from charges having only 0.5-in. and 0.6-in. rates. The highest rate during this period was 1.5 in. per hour. This slow percolation means high cyanide consumption and long treatment; but it also means larger slimes tonnage treated. It does not require a large increase in daily tonnage to pay for extra vats and a little more cyanide.

Residues are discharged through two 10-in. plug flanges placed 4 ft. from the sides of the vats. A 2.5-in. hose, with 2-in. nozzle, is used, under 115 lb. pressure, the hose being held in a swivel-clamp at the edge of the vat. The bottom 6 in. is cleaned out at reduced pressure. One man will sluice out a charge and clean the filter in from 3.5 to 4 hours.

The filter is three thicknesses of 16-oz. burlap, having the usual false bottom and rope grouting, and anchored to the vat bottom to counteract its buoyancy.

Precipitation is effected by zinc shavings in eight 10-compartment steel boxes, and it is perfect with the weakest solutions when run at the rate of one ton of solution per 24 hours per cubic foot of shavings. The shavings in the wash-solution box are lead-dipped. Whenever there were values in the effluent, running at the normal rate, they were found to be due to precipitate mechanically carried over after dressing boxes, and it was found best not to disturb a box after it had been running more than a week, but to add shavings on top as required.

The clean-up method, while it just about competed with refiners' rates, was not satisfactory. The precipitate was dried, fluxed and smelted direct, without either acid or roasting treatment, and without refining, which produced a bullion of 720 total fineness. The treatment loss was 1 per cent of the gold and 0.5 per cent of the silver. The clean-up cost, including freight and treatment of the resulting high-grade zinc-slag, was 17c. per lb. of dried slimes. This does not include charges for bullion shipment.

Operating costs per ton in detail for the last quarter, when 7,150 tons were treated, were as follows:

Cost of Treatment per Ton.

Cyanide, at $0.22 per lb.	$0.200
Zinc, " 0.09 "	0.020
Lime, " 0.009 "	0.001
Fuel, " 2.50 per cord	0.019
Clean-up supplies	0.029
Repairs	0.014
Miscellaneous	0.003
Labor (wages at $3.50 and $4.50 per day)	0.234
Total	$0.520

Assay office costs were not allocated; but the cyanide plant proportion should approximate $0.025 per ton. These results were obtained when treating but 78 tons per day. This cost can be reduced to 38.6c. when the plant is treating its full-rated capacity of 200 tons per day; and the introduction of reverberatory and cupel furnaces for clean-ups would still further reduce it.

MINING IN WEST AFRICA.

The London *Economist* says: "In his report on the Gold Coast for 1902, prepared under the supervision of the Governor, Sir M. Nathan, Capt. Armitage, Commissioner of the Southern district of Ashanti, observes that large sums of money have been invested in the mining industry of the colony, and adds that, 'with the completion of the Sekondi-Kumasi Railway and the building of the branch lines to some of the outlying mining properties, there will be justification for further investments in both mining and forestry enterprises that have been properly prospected by thoroughly competent men.' But the facts set out in Captain Armitage's report itself suggest that some substantial return on the money already subscribed for Gold Coast mining might reasonably be demanded before any further capital is invested in that direction. Captain Armitage points out that in 1901 the colony was overrun by prospectors, and that 2,825 concessions were taken up, many of which were subsequently abandoned. He further shows that actual mining operations are being conducted on comparatively few properties, and that of the exports of gold for 1902, amounting to £96,810, all, except £2,035, came from the Ashanti Goldfields Corporation and its offshoot—the Ashanti-Sansu mine. Nor do the figures for 1902 constitute a record, seeing that as far back as 1889 the gold exported was valued at £103,200, while in 1892 the total was £98,805."

GEOLOGICAL SURVEY OF CEYLON.—A mineral survey of Ceylon, restricted to minerals of probable economic value, is at present being conducted at the request of the Government of Ceylon, with the co-operation of the Scientific and Technical Department of the Imperial Institute. Mr. A. K. Coomaraswamy and Mr. James Parsons have been dispatched to the colony for this purpose.

MINERAL PRODUCTION OF MISSOURI IN 1902.

The report of Mr. George K. Williams, State Mine Inspector, on the operations of the lead and zinc mines of Missouri during 1902 will be ready shortly for public distribution. From an advance copy of the report, which has just been received, we abstract the following statistics and other information relating to the mining industry of the State:

The value of all ores and minerals (excepting tripoli and clay) mined in 1902 was as follows:

Zinc ores	$7,052,828
Coal	5,325,832
Lead ores	5,318,157
Iron ore and pig iron	1,403,700
Barytes	79,890
Nickel and cobalt ores	47,217
Copper ore	30,210
Total	$19,257,834

There was a large increase in values of the various products as compared with the preceding year, and the total shown above was the largest recorded in the history of the State. The output of zinc ore was 469,806,000 lb., and that of lead ore 253,520,000 lb. The increase in the production of zinc ore, as compared with 1901, was 21,666,000 lb., while the increase in the production of lead ore in the same period was 33,836,000 lbs. The amount received for the zinc ore product was $7,052,828, as against $5,308,671 for 1901, an increase of $1,744,157. The better prices received for zinc ore in 1902 is indicated by the difference between the percentage of increase in production, which was 5.2 per cent, and the increase in the value of the ore, which was 32.9 per cent. The increase in the value of lead was 12.7 per cent, while the increase in output was 15.51 per cent.

The price received for lead in Jasper county and the Southwest generally was well maintained, although the product fell short of the previous year. In the Southeast, however, there was a large gain in the output, but, as much of the product was smelted by the same companies producing the ore, the value of the product was estimated on the basis of the lead concentrates, instead of using the actual market prices. In this way, the average arrived at for lead in the southeastern district was $2.90 per ton less than was realized in the previous year; while the balance of the State maintained the average of 1901.

The prices received for the better grades of zinc ore averaged $30.79 per ton; the lower grades and silicates averaged $18.22 per ton.

The report says: "The ENGINEERING AND MINING JOURNAL, an authority in such matters, gives the total production of spelter in the United States for 1902 as 141,471 long tons—equivalent to 158,447 short tons, or 316,895,040 lb. If we allow 3,680 lb. of our better grades of zinc ore to the ton of spelter and 2.44 tons of silicate for a ton of the metal, our total zinc product converted into the refined zinc would furnish 125,631 tons of spelter, or 79.3 per cent of the entire production of the United States. That all of our product is not so converted is more than likely; yet the comparison affords a more ready conception of our relative standing with other zinc-ore producing States that can be had otherwise. The facts are that this State produces enough zinc ore to make nearly one-fourth of the world's product of spelter or 23.3 per cent. With the continued increase in the consumption of zinc ore, together with the steady increase from the old and tried fields, and the new sources of supply being developed in the central district, the great gains made of late years in our output of the ore will be repeated year after year.

"Southeast Missouri, as usual, shows a large increased production, and the same as to values; particularly is this true of St. Francois and Madison counties, St. Francois alone producing 70.09 per cent of the entire lead product of the State. The sinking of new shafts, developing work, additions and improvements have been general and noted in each mining camp. Mining in these counties is conducted on a large scale. There are 7 shafts in Madison and 21 in St. Francois operated by only 9 companies. The product from all of the shafts amounted to 185,230,000 lb. of lead concentrates for

the year 1902, the value of the same being $3,818,816. The value of the product averages $424,313 for each company in the two counties. One very decided advantage that these companies possess is in the fact that each one of them owns large bodies of mineral land that will require ages to exhaust of its ore, added to which is the fact that there is a continuity in the run of the ore-body not met with, as a rule, in other districts.

"In Southwest Missouri, particularly in the great Joplin field of operations, we find new mines opened during the year, which furnish as fine a record in productive qualities as its best mines of the past ever showed, with better prices received for the ore, to make them just that much more valuable. Joplin, Webb City, Carterville, Duenweg and Carthage have each been favored with some very remarkably fine mines. Mining districts come and go, but in the above districts mining remains at about the same old stand. With such natural resources as are here demonstrated and the human activities employed for still further advancement, prosperity is upon a pretty sure foundation."

The following table shows the total number of laborers employed in lead and zinc mines and mills and the number of accidents during the last two years:

	1901.	1902.	Changes.
Miners employed	6,628	7,404	I. 776
Mill-men and other help	3,484	3,138	D. 346
Prospectors	877	816	D. 61
Employees fatally injured	41	14	D. 27
Number fatally injured per 1,000	3.7	1.2	D. 2.05
Employees non-fatally injured	24	23	D. 1
Number non-fatally injured per 1,000	2.2	2.0	D. 0.2

The causes of the accidents in 1902 and the number injured thereby were as follows:

	Fatal.	Non-fatal.	Total.
Fall of roof and boulders	6	10	16
Fall of material down shaft	2	4	6
Falling down shaft	2	3	5
Premature blast	—	1	1
Machinery	1	—	1
Drilling into an unexploded shot	1	—	1
Struck by cage	1	1	2
Foul air	1	—	1
Steam pipe exploded	—	1	1
Shot exploded by lightning	—	3	3
Totals	14	23	37

The list of killed and injured included 3 foremen, 28 miners, 2 hoisters, 1 engineer, 1 tub-man, 1 pipe-fitter and 1 pump-man.

ELECTROLYTIC COPPER REFINING.[1]

By Wilder D. Bancroft.

Increasing current density increases the cost of power necessary for precipitating a given weight of copper and decreases the interest charge on the copper in the tank. Good adherent copper can be obtained at almost any current density, provided the rate of circulation be sufficient; with rising temperature the cost of power decreases, while the cost of heating the tanks increases. To strike a balance between these conflicting factors, the relation between voltage, current density and temperature for pure copper plates set a definite distance apart was determined in four solutions of compositions used in practice. The effect of the distance between the plates was eliminated by expressing voltages in terms of a voltage of 20°, and the percentage variations hold for any set of plates in the same solutions. Data were also obtained showing the relation between current efficiency, current density and temperature for pure copper plates in the same solutions. Finally the variation of cost with varying conditions of temperature and current density, was determined for the case of all power costing at the rate of $20 per h. p. a year, and also for the case in which steam heating costs only one-thirtieth of electrical heating.

The object of the first test was to determine the variation of voltage with variation of temperature, current density and solution. The following were the four solutions used: First, 16 per cent copper sulphate ($CuSO_4\ 5H_2O$) and 9 per cent sulphuric acid, the commercial solution used in multiple-system refineries; second, the same with a small addition of sodium chloride (1 ÷ 200,000,000 of solution); third, 16 per cent copper sulphate and 6 per cent sulphuric acid, the commercial solution used in series-system refineries; fourth, the same with a small addition of sodium chloride. The experiments were on a small scale, beakers being used instead of tanks. The results were compiled in a series of tables for temperatures between 20° and 90° C. and current densities between 1 and 4 amperes per square decimeter. The voltage required to obtain a given current density is materially less with the 9 per cent acid solution than with the 6 per cent. The addition of sodium chloride increases the voltage at the lower temperatures, but has very little effect at the higher temperatures.

A second test was to determine the variations of the ampere-hour efficiency, when operating with the same four solutions at varying temperatures and different current densities. It is found that the ampere-hour efficiencies for temperatures below 70° fall off very little and are practically 100 per cent. Even at a temperature of 90° with the high-current density of 4 amperes per square decimeter, the efficiency runs as high as 98 per cent for the 9 per cent and 99 per cent for the 6 per cent solutions, while a current density of 1 ampere per square decimeter gives an efficiency of 90 per cent and 91 per cent respectively. Between 50° and 70° the efficiency in some cases runs slightly above 100 per cent, due to the formation of small quantities of cuprous sulphate in the electrolyte. (Foerster and Seidel, who used current densities of 1 ampere per square decimeter and less, found that the current efficiency drops off rapidly above 50° C.)

The results show that the deterioration of solution is proportional to the ratio of anode loss to cathode gain. The solution deteriorates more rapidly at the higher temperatures and at the lower current desities. When operating at the lower current densities this deterioration of solution probably more than offsets the advantage of decrease in voltage which the higher temperatures give. When operating at 70° C. and 4 amperes per square decimeter, the ratio of anode loss to cathode gain is hardly any higher than temperatures between 20° and 50°. The watt-hours per gram of copper for the different solutions under different conditions are given in a series of tables; also the ratio of the watt-hours at higher temperatures to those at 20° and the ratio of the corresponding voltages. The results for the 9 per cent solutions without sodium chloride, for current densities of 3 and 4 amperes per square decimeter, were:

	Ratio of voltage to that at 20°.	Ratio of watt-hours to those at 20°.
20° C. 3 amp. per sq. dm.	1.000	1.000
50° C. 3 " " " "	0.600	0.600
70° C. 3 " " " "	0.441	0.440
90° C. 3 " " " "	0.347	0.354
20° C. 4 " " " "	1.000	1.000
50° C. 4 " " " "	0.605	0.605
70° C. 4 " " " "	0.454	0.454
90° C. 4 " " " "	0.362	0.368

A special test, using solutions containing iron, showed no falling off in the current efficiency.

A radiation run was made to form some idea of the relative costs of operating, at various temperatures, runs with covered and uncovered tanks. The temperatures of the electrolyte in a covered tank fell from 96.1° to 44° C. in 123 minutes, and in the same tank uncovered from 94.5° to 44.7° in 60 minutes. The power in watts required to overcome the radiation of heat and keep the temperature unchanged is thus shown:

	90°	80°	70°	60°	50°	
Covered tank	44.0	36.6	28.8	21.7	14.5	watts.
Uncovered tank	145.0	90.4	50.6	34.4	20.6	"

To get the watts for commercial tanks of 9 by 2 by 2.5 ft. size, as used in the Baltimore refinery, the figures in the table are to be multiplied by 100.

All the data obtained in the tests were used to calculate the cost of refining, assuming that the heating of the electrolyte is done by means of the electric current and that the ampere-hour efficiency is 100 per cent. These data were taken as a basis: Dimensions of tank, 2 by 2½ by 9 ft., one tank containing 130 electrodes of two plates each; weight of copper per tank, 5,700 lb.; value of copper per tank, $800; cost of power, $20 per h. p.-year; plant temperature, 20°. The following items of cost were taken into consideration: Cost of kilowatt-hours required to precipitate one tank of copper; cost of heat required to keep the temperature of the electrolyte constant; interest on the copper in one tank at 6 per cent. The sum of these three items, called 'total cost' is given in a long table from which the following is an extract:

Cost per Tank of Copper.

Amperes per. sq. dm.	At 50° C.	At 70° C.	At 90° C.
2.0	$2.70	$3.87	$5.09
3.0	2.58	2.57	3.39
4.0	2.72	2.33	2.54

Corresponding Costs Per Ton.

Amperes per. sq. dm.	At 50° C.	At 70° C.	At 90° C.
2.0	$0.95	$1.36	$1.79
3.0	0.91	0.90	1.19
4.0	0.95	0.82	0.89

Though these figures are based on experiments with the series system, it is probable that the conclusion to be drawn would apply to the multiple system. The kilowatt-hours per kilogram of copper will be larger in a multiple tank, owing to the greater distance between plates. The radiation losses are probably greater also, owing to the tanks being relatively wider. There is little difference otherwise, as the extra interest charge in the multiple system by the use of thick anodes is offset by the possibility of removing the cathodes before the end of the run, which cannot be done in the series system. The following table gives the results calculated on the basis of electric power at $20 per h. p., year and heating by using steam coils at one-thirtieth the price of electric heating:

Cost Per Ton of Copper.

Amperes per. sq. dm.	At 50° C.	At 70° C.	At 90° C.
2	$0.91	$0.83	$0.80
3	0.91	0.78	0.72
4	0.95	0.82	0.89

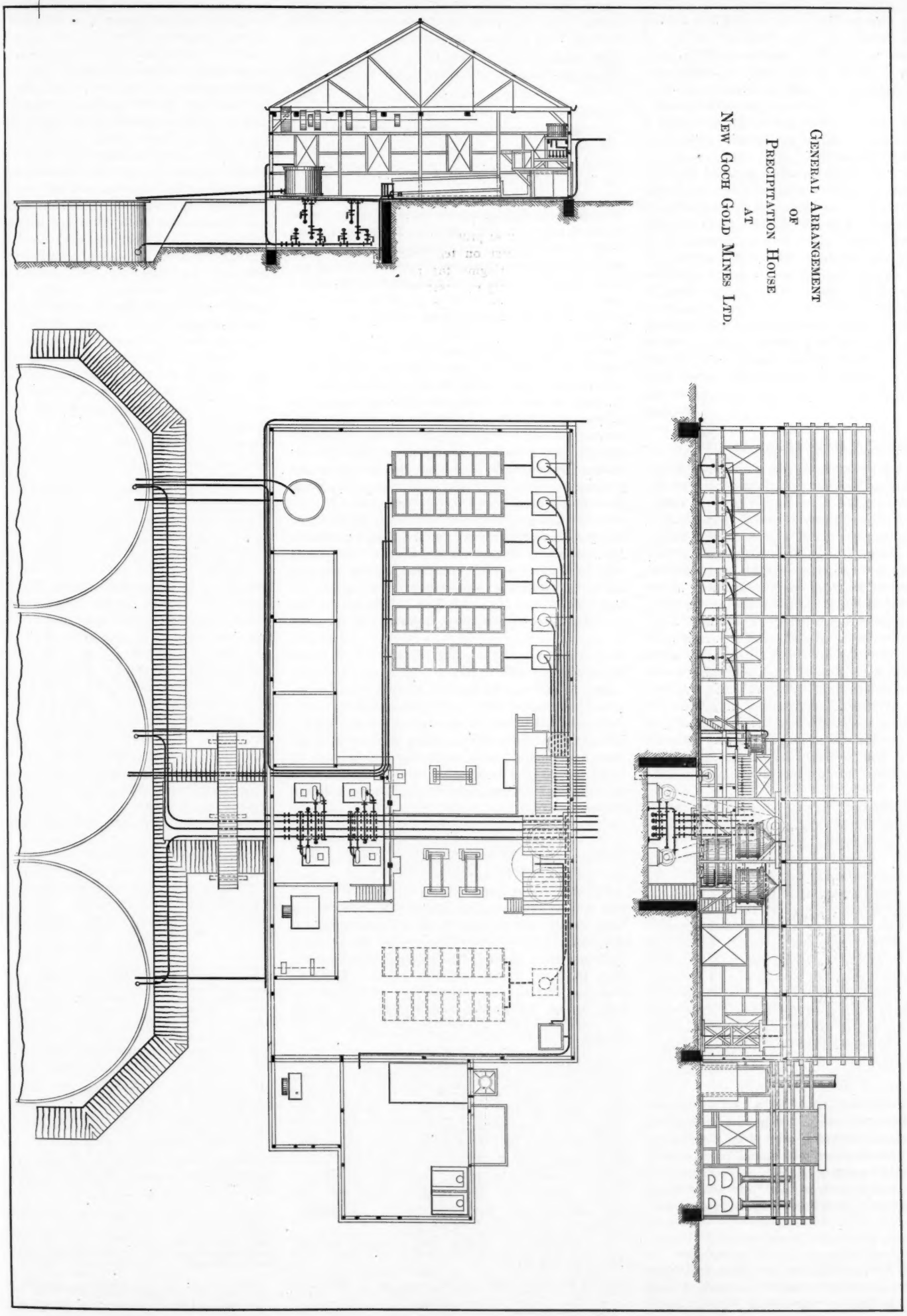
The commercial cost per ton of copper will be between the figures given in the last two tables. These figures comprise only the three items stated; they do not include the cost of labor, and are based on the assumption of 100 per cent ampere-hour efficiency. Since the number of men employed does not vary with the current density, the labor cost per ton of copper will be less, the higher the current density. The correction for the actual current efficiency is easy to apply when one has the data, and will not affect the general results, because the current efficiency is practically independent of the temperature and current density at temperatures below 90° and within the range of current density considered. The deterioration of the electrolyte need not be considered, because the amount of deterioration is also practically independent of the temperature and current density at 90° temperature and below.

To apply these results to the commercial problem of copper refining, two sets of curves were plotted, one showing the relation between the cost of precipitating a ton of copper and the operating temperature, the second set showing the relation between the cost of precipitating a ton of copper and the operating current density. From these curves the conclusion was drawn that the results at 70° C. seem the most satisfactory with a current density of 3.5 and 3.75 amperes per square decimeter. Under these conditions no extra power would be required to heat the solution. Operating at this current density with covered tanks, the current alone would be sufficient to heat the electrolyte to over 80° C. In order to secure good circulation, essential for a good deposit with high-current densities, the method of pumping could be retained. If the gutters leading to and from the pump were properly insulated, the solution would not drop below 70° C. before returning to the tanks.

(*Concluded on page 742*)

[1]Abstract of a paper read at the Niagara Falls meeting of the American Electrochemical Society, 1903.

GENERAL ARRANGEMENT OF PRECIPITATION HOUSE AT NEW GOCH GOLD MINES LTD.



A PRECIPITATION HOUSE ON THE WITWATERSRAND.

On the present page we publish a drawing of the general arrangement of a precipitation house to be erected at the cyanide works of the New Goch Mines, Ltd. This drawing accompanied the paper by Mr. H. S. Denny, several abstracts of which we have taken pleasure in giving to our readers because they have afforded the latest experience in cyanide practice on the Rand. The arrangement of the house shows the results of this experience.

Moreover, running at this high-current density, there would be a considerable saving in the first cost of the plant, inasmuch as fewer tanks are needed for the precipitation of a given amount of copper in a given time. The lower the cost of heating, the greater the advantage of a high temperature. Lowering the rate of interest decreases the advantage of a high-current density. With covered tanks, it will be possible for men to work in the tank room even with the electrolyte at 70°.

If the cost of working under so-called standard conditions for open tanks—that is, a current density of 14 amperes per square foot, and a temperature of 50°—is compared with the cost of working with covered tanks at 70° and a current density of 3.5 amperes per square decimeter (31.5 amperes per square foot), the saving by the latter method will be very close to $1 per ton of refined copper when all power is figured at $20 per horse-power-year.

Therefore, in order to operate a plant most economically, the author concludes, copper should be refined electrolytically under these conditions: Covered tanks; current density 3.5 amperes per square decimeter; 70° C. temperature.

THE RUSSIAN MANGANESE INDUSTRY.

The manganese mines of the Caucasus contributed in 1902, as heretofore, a large share of the world's supply of this mineral, although the output was less than in the previous year. According to data taken from semi-official sources, the production was 408,571 metric tons, which compares with 418,821 tons in 1901 and 661,154 tons in 1900, the latter total being the largest recorded for any one year in the history of the industry. Outside of the Caucasus district there are mines in the Urals, and near Nicopol in the province of Kutais, which furnish from 50,000 to 75,000 tons of ore annually. The statistics of export in 1902 show some increase over the previous year's figures, but the larger demand was not accompanied by any material improvement in prices. For some time past the production has been greatly in excess of the demand, and it is stated that there are now not less than 650,000 tons of ore in stock at points of shipment on the Caucasus Railroad and the Black Sea.

The Russian industry at present is passing through a more or less critical stage, the result of lack of organization in the mining and selling of the ore and of competition with other countries. The growing importance of the mines in Brazil and India has had much to do with the decline in the Russian exports. Efforts are being made to relieve the situation, but so far they have not led to any appreciable improvement. It has been proposed to smelt the ores in Russia and to export the ferromanganese. Another plan, which has received some attention, aims to bring about united action on the part of the miners, and to improve the export conditions. The main difficulty in the way of carrying out any such scheme is the large number of individual concerns engaged in the industry.

THE BRIDGEWATER TRUST.—The famous trust created by the Duke of Bridgewater, which has been in existence 100 years, expired on October 26, and the Earl of Ellesmere took formal possession of the extensive Bridgewater estates and collieries. The trust owned many collieries, and was active many years ago in furnishing canal transportation for coal in England.

A STATE COAL MINE.—The State coal mine owned by the Government of New Zealand, at Coal Creek in that colony, is being rapidly developed, and it is expected that coal from this mine will be put on the market at the close of the year. The quality of the coal, as shown by the development work, is very good. The hoisting machinery has been ordered in England, and will shortly be shipped. The cages, cars and similar work will be made in the colony. The experiment is in line with some others made in New Zealand, the intention of the Government in operating this mine being to regulate prices, and to prevent exorbitant charges for coal by private parties.

ABSTRACTS OF OFFICIAL REPORTS.

Anglo-Sicilian Sulphur Company, Limited.

For the year ending July 31, 1903, its seventh year, this company, known as the Sicilian sulphur combination, reports a gross profit of £147,992, to which must be added interest on temporary investments and other receipts, bringing the total to £154,649. After deducting working expenses and writing off a sum of £4,617 for depreciation in the guarantee and reserve fund investments, there remains a net profit of £120,513.

Out of this net profit, an interim dividend, at the rate of 6 per cent per annum on the 700,000 fully paid preference shares for the six months to January 31, 1903, was paid in April last, absorbing £20,994, less income tax. It is now proposed to pay a further dividend at the rate of 6 per cent per annum, less income tax, in respect of the second half of the year, absorbing £21,000, making a total distribution on the preference shares of £41,994, less income tax, being 6 per cent for the year ended July 31, 1903.

Of the balance of £78,519 remaining, 20 per cent, or £15,704, has been credited to the capital guarantee fund, which now amounts to £82,362. A further sum of £39,371 has been added to the reserve, against any eventual depreciation of stocks of sulphur, which now totals £96,401. The general reserve fund stands at £123,902, making, with the capital guarantee fund as above, a reserve of £206,264, besides the sum held for any depreciation of stocks of sulphur.

After reserving £4,000 for income tax, the remainder of the net profit is divisible as follows: One-tenth, or £1,944, free of income tax, to the preference shareholders, which will admit of a further dividend, in addition to the 6 per cent already paid, of 0 2-3d. per share; nine-tenths, or £17,500, as a dividend of 6d., or 50 per cent on the 700,000 ordinary shares.

Granby Consolidated Mining, Smelting & Power Company, British Columbia.

The brief report issued by this company covers the year ending June 30, 1903, during which operations have been successfully conducted with a fair margin of profit. The balance sheet shows that the liabilities of the company were: Capital stock, $13,363,030; surplus, $683,535; current accounts payable, $128,169; total, $14,174,734. The company has no debt of any kind, except the current monthly accounts, which are much more than covered by cash and bills receivable.

The development work done upon the property during the year included 3,127 ft. of drifts, cross-cuts, etc., in the mine, and 28,400 cu. yd. of stripping in the open-cut work. The total ore taken out and shipped to the smelter was 295,820 tons. The smelter statement shows that there were treated in the furnaces 289,583 tons of Granby ore; 7,690 tons of purchased ore from other mines, and 6,130 tons of purchased matte. The total product from the ores and matte treated was 12,551,758 lb. fine copper, 277,574 oz. silver, and 35,121 oz. gold.

The statement of receipts and expenses for the year is as follows:

Received for metals won	$2,232,741
Rents and real estate	38,512
Total gross earnings	$2,271,253
Working expenses, mine and smelter	1,136,831
Foreign ores purchased	72,954
Foreign matte purchased	766,005
Total expenses	$1,975,790
Net earnings for the year	$295,463

The gross receipts, as given above, represent the net proceedings of the metals produced at the Granby works, freight to New York, refinings and other charges being deducted from the total. There was expended in new construction at the mines and smelter during the year the sum of $207,481. Adding to the net profits for the year, as shown above, the surplus of $398,072 carried over from the preceding year, made a total of $693,535. The company gave as a bonus to its valued employees 1,000 shares of stock, having a par value of $10,000; deducting this from the surplus leaves a net balance of $683,535.

The report says that the operations during the year were hampered by difficulties in the coal and coke situation, which made it necessary to run the smelter plant at only about one-half of its full capacity. These difficulties have now been overcome, and no further trouble is expected. The smelter plant has been increased by two furnaces, making six in all, which will be run full from now on, in place of two furnaces, as was the case last year; of course, this change will greatly increase the output. The plants at the mines and at the smelter are in a high state of efficiency, while the mines are now developed so as to produce a very large tonnage without further special expenditure. All development work and repairs were charged to current expenses.

Norfolk & Western Railroad Company.

This company, as is well known, is a very large carrier of bituminous coal and coke. The total receipts of the railroad for the year amounted to $21,160,675; the operating expenses were $12,697,430; leaving net earnings amounting to $8,463,245. The total freight carried by the railroad was 14,110,181 tons, of which considerably more than half was coal and coke. The total tonnage of coal was 6,244,118 tons, and of coke 1,661,094 tons. In addition to this coal and coke, the company also carried a large quantity of other mineral freight, including 1,111,085 tons of iron ore, 3,051 tons of manganese ore, 13,212 tons of spelter and zinc ore, 418,242 tons of limestone, 107,490 tons of marble and building stone, 8,267 tons of gypsum, or land plaster, 36,830 tons of salt, and 130,484 tons of other mining products. Moreover, there were carried 657,292 tons of pig iron and of finished iron and steel.

The movement of coal from the mines, and the directions in which it was delivered, are shown in the following table:

From:	1902.	1903.	Changes.	
Pocahontas	5,002,794	5,450,351	I.	447,557
Clinch Valley	538,615	623,536	I.	84,921
Tug River	135,544	229,145	I.	93,601
Thacker	605,418	884,148	I.	278,730
Kenova	67,631	80,630	I.	12,999
Other N. & W. fields	28,160	78,054	I.	49,894
Total	6,378,162	7,345,864	I.	967,702
Delivered to:				
Tidewater	2,546,369	2,487,031	D.	59,338
Local points on line	968,602	1,186,508	I.	217,906
Connecting roads	1,865,778	2,495,970	I.	630,192
Used by company	997,413	1,176,355	I.	178,942
Total	6,378,162	7,345,864	I.	1,027,040

In addition to the coal originating at points on the line, 64,033 tons were received from connecting roads, making a total of 7,409,897 tons carried, against 6,452,699 tons in 1902.

The movement of coke over the road for the year was as follows:

From:	1902.	1903.	Changes.	
Pocahontas	1,210,459	1,292,439	I.	81,980
Clinch Valley	261,983	340,379	I.	78,396
Tug River	2,073	12,956	I.	10,883
Other N. & W. points	.....	306	I.	386
Total	1,474,515	1,646,160	I.	171,645
Delivered to:				
Tidewater	92,461	32,886	D.	59,575
Local points on N. & W.	833,739	980,808	I.	147,069
Connecting lines	544,199	628,088	I.	83,889
Used by company	4,116	4,378	I.	262
Total	1,474,515	1,646,160	I.	171,645

In addition to the coke originating on the line of road, 19,312 tons of coke were received from connecting lines, making the total carried 1,665,472 tons, against a similar total of 1,488,984 tons in 1902.

It is of interest to add that the average haul of freight for the year was 258 miles, and the average

freight-train load was 486 tons. The average receipts per ton-mile were 0.49c., and the expenses, 0.29c. There was an increase in expenses, owing to the higher cost of supplies and materials.

During the year several branches were built to reach coal mines, chiefly in the Pocahontas region and in the Tug river country. Several new iron and coal mines were opened on the line of the road during the year.

The general manager's report says that, at the close of the year, there were 123 coal and coke companies in operation on the line of road; 7,971 coke ovens were completed and 1,675 under construction, including 237 completed and 376 under construction for the United States Coal & Coke Company. In addition to these there are coal mines in the Thacker and Tug River districts about ready for operation. On June 30, 1903, there were in operation on the line of the road 17 coke iron furnaces, with an estimated aggregate capacity of 2,015 tons of pig iron per day; four furnaces, aggregating 450 tons of pig iron per day, were out of blast at that date.

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail price. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

Western Australia. Report of the Department of Mines for the Year 1902. H. S. King, Under-Secretary for Mines. Perth, W. A.: Government Printer. Pages, 210; with maps and illustrations.

New York State Museum Bulletin, No. 70. List of New York Mineral Localities. By H. P. Whitlock, Albany, N. Y.; published by the University of the State of New York. Pages, 108. Price, 20 cents.

Proceedings of the South African Association of Engineers. Volume I., No. 1. May, 1903. Ernest Williams and G. S. Burt Andrews, Editorial Committee, Johannesburg, Transvaal; published by the Association. Pages, 224; illustrated.

South Australia. Report on the Gold Discoveries near Winnecke's Depot, and the Mines on the Arltunga Gold-fields. H. Y. L. Brown, Government Geologist. Adelaide, S. A.: Government Printer. Pages, 8; with maps and illustrations.

Index to Publications of the New York State Natural History Survey and the New York State Museum. 1837-1902. By Mary Ellis. Albany, N. Y.; published by the University of the State of New York. Pages, 654. Price, 75 cents.

BOOKS REVIEWED.

Economic Minerals of Nova Scotia at the Provincial Exhibition, 1903. *Catalogue and Description.* E. Gilpin, Jr., Inspector of Mines. Halifax, N. S.; Public Printer. Pages, 38.

This pamphlet contains a list and description of the Nova Scotia minerals which were collected for the Provincial Exhibition, held at Halifax in September, 1903. It also gives condensed information regarding the occurrence, character and composition of the economic minerals occurring in the Province.

Ontario. Report of the Bureau of Mines, 1902. Thomas W. Gibson, Director. Toronto, Ont.; Public Printer. Pages, 352; with maps and illustrations.

Besides the usual statistical reports and accounts of progress in the various mining districts, this volume contains several valuable technical articles, the more important of which are 'Peat Fuel, Its Manufacture and Use,' by W. E. H. Carter; 'The Sudbury Nickel Deposits,' by A. P. Coleman; 'Iron Ranges of Northern Ontario,' by W. G. Miller, and 'Magnetic Concentration of Iron Ores,' by J. W. Wells.

Home Mechanics for Amateurs. By George M. Hopkins. New York: Munn & Company, Publishers. Pages, 370; illustrated. Price, $1.50.

The object of this book is to describe mechanical tools and apparatus of simple construction, and to show how they may be used by the amateur in making various articles of ornament and practical value. There are chapters on wood working, household ornaments, metal working, model engines and boilers, meteorological instruments, telescopes and microscopes and electrical apparatus. Although intended principally as a guide to the inexperienced, the text will be found suggestive to the more expert mechanic. The book is attractively bound and illustrated.

Cyanid-Prozesse zur Goldgewinnung. By Manuel von Eslar and Dr. Georg Erlwein. Halle a. S., Germany; Wilhelm Knapp. Pages, 120; illustrated. Price (in New York), $1.40.

The authors of this monograph have given a clear, succinct description of the cyanide process as used in the recovery of gold from ores. The process, as originally developed by McArthur and Forrest and by Siemens & Halske, is first discussed briefly, and then the various modifications of the process are reviewed in some detail. There are also chapters on chemical theory and the costs of the process as carried out in the mines of the Transvaal and the United States. The text is illustrated with drawings of apparatus and typical installations. The volume is particularly adapted for the use of students as an introduction to the more advanced treatises and discussions that have appeared in technical literature.

Report of the State Bureau of Mines of Colorado. By Harry A. Lee, Commissioner. Denver, 1903: State Printer. Pages, 310; with map.

This volume, uniform in appearance and general character with its predecessors, reviews the progress in metal mining in Colorado during the fiscal years 1901 and 1902. It is replete with information relating to the production of the precious metals in the different districts of Colorado, and it also gives details in regard to geology, vein formation, ore deposition and the situation of the productive mines. For the sake of ready reference, the text is arranged in chapters headed by the names of the counties, so that the description of any mine or district may be found complete under its proper heading. The report calls attention to the present satisfactory state of the mining industry of Colorado, and predicts that it will maintain its important position for a long time to come.

Transactions of the American Electrochemical Society. Volume III, 1903. Philadelphia: The American Electrochemical Society. Price, $3.

In this volume is included the full text of the papers presented at the third general meeting of the Electrochemical Society, together with criticisms and discussions of the papers by members, and a lecture on radium and radioactive substances, which was delivered before the society by Wm. J. Hammer. Among the more important subjects of scientific and technical interest may be noted the following: 'Determination of Vapor Densities in an Electrical Furnace'; 'Free Ions in Aqueous Solution'; 'Electrolysis of Water'; 'Historical Review of the Storage Battery'; 'Influence of Some Impurities in Salt upon the Yield of Caustic Soda by the Amalgam Process'; 'Corrosion of Metals by Electrolysis'; 'Notes on the Composition of Electroplating Solutions'; 'Ions and Electrons'; and 'Single Potentials of Zinc in Aqueous Solution.' Although the Electrochemical Society was founded less than two years ago, it has already secured a firm footing, and without doubt will prove of great utility in the broadening field of endeavor which it represents. This is fully confirmed by the present volume.

Uses of Peat and its Occurrence in New York.— By Heinrich Ries, Albany, N. Y.; University of the State of New York, 1903. Pages, 90; illustrated. Price, 10c.

Every once in a while somebody calls attention to the peat swamps of the United States and Canada, and alleges that a cheap fuel exists in vast quantities, which, if properly prepared, will prove of such value that people in the Northern States can regard with equanimity the approaching exhaustion of the coal-fields on which they are now dependent. One of the latest of these peat enthusiasts is Mr. Edward Atkinson. The little pamphlet under review, a reprint from the 'Twenty-first Report' of the New York Geological Survey, may help to correct some of the mistaken ideas one is apt to get from the writings of special pleaders for peat. It briefly tells what peat is, gives a large number of analyses, mentions the methods used in digging and preparing peat and its chief uses, and gives a list of the principal peat bogs known in New York State, concluding with a bibliography.

Ausgewählte Methoden der Analytischen Chemie. Volume II. By Dr. A. Classen, assisted by H. Cloeren. Braunschweig, Germany; Frederick Vieweg & Sohn. Pages, 832; with two spectrum tables and 133 illustrations. Price (in New York), $7.

The first volume of Dr. Classen's 'Select Methods' that appeared a few years ago had a hearty reception, and was soon published in an English translation. The success of the volume was due to several factors. Dr. Classen is one of the best living authorities on laboratory methods, and his book, covering both qualitative and quantitative analysis, aimed to give what the author considered the best methods for the determination of the various metals. Thus, in quantitative work it described gravimetric, volumetric and even colorimetric methods. Again, the book gave particular attention to the determination of the rare metals, a branch of analytic work of increasing importance. Finally, the methods given had been tested by the author, or by his assistants. In fact, the only work that in any way compares with Dr. Classen's is Professor Crookes's 'Select Methods in Chemical Analysis,' and it is no disparagement to the latter work to say that Dr. Classen's has points of superiority as a laboratory aid for the advanced student or the working chemist.

The present volume is on the same lines as the first. It takes up the determination, qualitative and quantitative, of oxygen, ozone, hydrogen peroxide, water in syrups and organic substances, water analysis, the determination of sulphur, bromine, iodine, fluorine, nitrogen (including the analysis of dynamite and nitrocellulose), argon, helium, phosphorus, boron, silicon, carbon, carbon monoxide and dioxide, the cyanides, methane, acetylene, and the elementary analysis of organic compounds. As an example of the scope of the book may be cited the chapter on silicon. This gives first various blowpipe tests for silica and silicates, mentions briefly the quantitative determination of silica in iron, aluminum alloys and ferrochrome, then takes up the quantitative determination of silica in silicates not acted on by acids, the separation of lithia from sodium and potassium, the breaking up of silicates by carbonate of lead and by boric acid, the determination of iron oxide in silicates, the determination of silica in cryolite, the analysis of carborundum, the drying of silicates and the determination of the contained water.

In an appendix are descriptions of the determination of ozone, the iodometric determination of tellurium and the Emmerton method of determining phosphorus in iron. The book has excellent indices both by authors and by subjects. It contains fine colored plates, showing the spectra of hydrogen, oxygen and nitrogen, and of the rare gases, helium, argon, krypton and neon.

Outlines of the Geology of Japan. Part III. Economic Geology. Compiled by the Geological Survey of Japan. Tokyo, Japan; Imperial Press. Pages, 126.

This book, or pamphlet, printed in English, gives a good idea of the mineral resources of Japan, particularly as regards the geologic occurrence of the principal ores. The statistics are in Japanese units and are brought up to 1899 or 1900. The pamphlet is part of the descriptive text published to accompany the geological map of the Empire, and should interest anyone looking for information about the mineral wealth of the country, this being, it may be noted, more varied than is generally thought. The pamphlet shows that mines of gold, silver, copper, lead, tin, antimony, iron, coal and sulphur are being worked. There are, besides, several small oil-fields, some of which are nearly exhausted, and quarries of limestone, slate, building stone, etc. There are, besides, a variety of minerals and mineral substances found in the Empire that are not mined in a commercial way. The mineral deposits of chief importance are those of coal, copper, antimony and sulphur.

The Mechanical Engineers' Pocket-book. By D. Kinnear Clark. *Fifth Edition;* Revised and Enlarged, by H. H. P. Powles. New York: The D. Van Nostrand Company. Pages, 716; with diagrams and tables. Price, $3.

This pocket-book, compiled especially for the use of mechanical engineers by the late D. Kinnear Clark, himself a mechanical engineer of long experience, has been in general use since its first appearance in 1891. Mr. Clark's death, in 1896, left the work of revision to others. Mr. Powles, who undertook it, has brought the 'Pocket-book' up to date, and has made many necessary additions, besides revising and correcting it throughout—without, however, interfering with the original plan of Mr. Clark. The section dealing with electrical engineering has been largely re-written, with additions, so as to adapt it to recent developments, although much of the valuable matter contributed to that section in earlier editions, being of permanent utility, has been retained. The subject of alternating currents has been only lightly touched upon, it being held that any such full treatment of the subject as would be of practical use lies outside the scope of a pocket-book like this. In other sections, new matter has been added as required, thus bringing the work thoroughly up to date, and maintaining its character as a presentation of modern every-day practice. In the result, the volume has been enlarged by about 40 pages.

Engineering Preliminaries for an Interurban Electric Railway. By Ernest Gonzenbach. New York: The McGraw Publishing Company. Pages, 72; illustrated. Price, $1.

This little volume, the author states, is in no way to be construed as an attempt to generalize and instruct others in the art of railway construction, but is intended to show the way in which certain conditions were to be met in a certain case, together with the reasons which lead to the recommendations and plans therein submitted. The writer points out that many cross-country electric roads are now suffering from financial troubles due to unnecessarily heavy rolling stock. The author, in reporting on the proposed road and its installation, showed that by using smaller motors, sub-stations and power-house equipments, as good or better service could be given than with heavier equipment, by a very simple departure from the accepted form in the time-table in use on most railways.

The book discusses the probable income of the road and its general requirements, the relative merits of the third rail and the trolley, the roadbed track and rolling stock most advantageously used, and the construction of car shops, power stations, transmission line, distributing system, etc., and gives a detailed estimate of the total cost of the railroad with the probable operating expenses. The author, in conclusion, summarizes his recommendations by observing that it is well to invest less money in electrical equipment, power stations, transmission line, sub-stations, track rails and third rail, and more money in track ballast, car shops, trucks, block signal systems and waiting stations. The book has the merit of being plainly written, while the author's recommendations are thoroughly practical.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
Letters should be addressed to the EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Some Words and Their Ways.

Sir.—Your editorial in the current issue on 'Some Words and Their Ways' states the case against misuse and ambiguity in a clear manner and the examples are well chosen, with one exception.

Transportation is too useful a word to be cast out, as you advise. Its ugly significance does not occur at once to the majority of Americans, however the English may view it. In the sense of 'deportation' it has been little used in this country. On the contrary, 'transport,' as a noun, will first suggest to many a vessel for carrying troops. The best usage seems abundantly to sanction the use of 'transportation,' where you desire 'transport.'

For an authority I refer you to the 'Century Dictionary.' The first definition of 'transportation' is, "The act of transporting, or conveying from one place to another, or the state of being so transported." The second definition is, "The removal or banishment, for a specified term, of a convict to a penal settlement in another country."

The colloquial meaning of railway pass or cost of transportation suggests itself to most, I think, in advance of that just quoted. And, at any rate, the same objection may be urged against 'transport' as you make to 'transportation,' for the former means, also, "A convict transported or sentenced to exile."

'Locate' seems to be next of kin to 'proposition', it is almost as elastic. The latter word covers anything you please, from a problem in geometry to a mine; from the football championship to the latest industrial flotation. FRANKLIN W. SMITH.

Bisbee, Arizona, Oct. 30, 1903.

Bromo-Cyanide.

Sir.—The writer has read with interest your reply to the inquiry signed 'Bromo-Cyanide' on page 628 of your issue dated October 24. You quote Mr. James as saying in his book, written years ago, that bromo-cyanide costs about 90c. per lb. This statement would be rather discouraging to any one intending to use bromo-cyanide, particularly as the price is now much lower than that given by Mr. James.

There is a process by which bromo-cyanide can be made so as to cost very little more than one-tenth of the price quoted by Mr. James on page 135. In Mr. James's book he states that bromo-cyanide can be made on the ground by adding diluted bromine water to a cyanide solution, the latter being in excess. This being the case, and as bromine can be purchased for 40c. per lb., as per quotations in the ENGINEERING AND MINING JOURNAL, and as the trust companies purchase it for as low as 20c. per lb., it would not cost over 10c. for sufficient bromine for a ton of the ordinary cyanide solution.

Because of the well-known advantages obtained by the use of the bromine in connection with the cyanide solution, I hope you will make this correction in the columns of your highly esteemed paper.

I might also state that it has been demonstrated that where some of the bromine has combined with the potassium in a cyanide solution, plenty of free oxygen will liberate the bromine from the potassium to combine with more cyanogen, thus making new cyanogen-bromide. This will result in a saving of the bromine, provided too much of it is not used, and it be used with compressed air, or with barium dioxide, which latter would also be very beneficial not only for its oxygen, but also for its barium, to prevent the ore acids from wasting the cyanides of the precious metals.

Therefore, when from 2 to 4 oz. of liquid bromine will be sufficient for a ton of an ordinary cyanide solution, and the bromine can be purchased at from 20c. to 40c. per lb. at the salt works, it can be readily seen that ten cents' worth of bromine to the ton of the cyanide solution will not be of sufficient consequence to discourage its use, as the quoted price of 90c. would. T. B. JOSEPH.

San Francisco, Oct. 29, 1903.

[The writer of the above refers to 'Cyanide Practice' as an out-of-date book; as a matter of fact, the last edition appeared this year.—EDITOR.]

The New Ratio of Exchange Between Silver and Gold.

Sir.—There appears to be still some misunderstanding as to the proposed new gold standard for silver and the results likely to accrue therefrom. Mexico took the initiative in the movement; she converted China, then her representatives visited the United States to secure an approval and aid. At that time silver had gone down to 21 5-16 pence an ounce. Trade between the silver and gold countries was in danger of utter collapse. Prophets of evil said that silver must decline to the value of copper. The time had certainly come when some powerful national or international effort had to be made, unless all silver values were to vanish in chaos.

Within certain limits the decline of silver had greatly stimulated Mexican industries. With gold at from 100 to 160 premium, any one who could produce or manufacture on a silver basis anything of demand in the gold markets had a certain fortune. A poor decrepit old man, who had been for years shipping fine woods from the west coast to the American market, found himself suddenly a millionaire. He had been "living on quinine," as he described it. He was nearly as yellow as the gold he had won. Under this stimulus Mexico, which formerly produced little but silver, with the balance of trade always fatally against her, has actually raised her exports to equal or exceed her imports. Nevertheless, silver is still her chief product; she stands first among the silver producers; the United States being next. Jointly they produce two-thirds of the silver product of the world.

Of course some limit must be found to the decline of silver, and to its fluctuations, otherwise all the silver nations must go into bankruptcy. Silver fluctuating between 40d. and 20d. means that sustained commerce is impossible. Silver at par—that is, at the legal ratio with gold—is worth in American money $1.2929 the ounce. It had declined to about 40c. The Mexican Secretary of the Treasury has said that he would be satisfied if the silver dollar could be held at a steady value of 50 cents gold. That is the aim. That is the value of the American Philippine dollar, and proportionally of the Indian and Japanese silver coin. Below that, payments to gold standard countries by the nation of the silver standard are made at a ruinous loss. It may be said, speaking generally, that all silver standard nations are debtor nations. Thus, when China was called upon the pay in silver, at its lowest, the enormous obligations imposed upon her by her conquerors, it involved a frightful loss, and a loss which even barbaric conquerors would not have forced upon her. If it had been persisted in, her dismemberment must have resulted. It is to stay that and other catastrophes that the new fixed ratio of exchange is being promoted.

The Mexican Secretary of the Treasury was very frank in his announcement to the silver miners and others. He warned them that the new standard might result in a certain small direct loss, as your correspondent, Mr. Edgar Rickard, has foreseen in his clever and thoughtful letter. The rate of wage and of material must rise, *pari passu* with the rise in silver; and the premium on exchange must decrease, if silver bullion holds its advance, or continues to increase in value; but that loss is trifling, as compared to the benefit certain to accrue from the stability of silver coin and of all silver values. Moreover, the silver miners of Mexico, especially the American miners, must remember that they have been enabled to keep their mines in constant profitable operation, while all the American silver mines proper have been closed. They have had the same advantages in the sale of their product that the old exporter of fine woods had. Their exchange also has ruled at from 100 to 160 per cent premium. Moreover, if the effort were made to put silver coin at par with gold, or, at any rate, considerably in excess of the rate proposed, the coinage being limited, it would close every silver mine in Mexico.

Mr. Guggenheim is quoted as saying, most pertinently: "It is not a question of what ratio we ought to have, but what we can get. The ratio of 32 to 1 will be of immense benefit to people of many nationalities. It will enable China to become a purchaser, thus creating a great demand for the products of other countries." And not only China, but the inhabitants of all the silver-using countries, embracing possibly three-fourths of the population of the globe.

In return for the comparatively trifling loss the miner may sustain, in common with other producers of the silver-standard countries, he will receive stability for the value of his product, of his exchange, and, above all, of his property. Already the movement has restored the price of silver to 28d., and has held it quite steady at that figure for some time. The revival and growth of trade in China and the Far East must afford a market capable of absorbing the surplus of silver bullion for many years. It is no longer an insuperable obstacle to the development of a mine, that the bulk of its product is silver. Foreign and American capital is pouring into Mexico, old mines are being reopened and new ones incorporated every day. No greater tribute could be paid the able Mexican statesmen who have inaugurated and sustained this vitally important movement, than the flood of prosperity which is already pouring over their country like a tidal wave.

HENRY S. BROOKS.

Dobbs' Ferry, N. Y., Nov. 2, 1903.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

MISSOURI LAW ON BLASTING IN COAL MINES.—At the last session of the Missouri Legislature the law relating to blasting in coal mines, and especially to the employment of shot-firers, was amended in several points. The sections on this subject, as amended, are given below:

"Section 8826. Explosives to Be Kept in a Strong Box—Shot-Firers to be Employed.—All owners, agents or operators of coal mines shall require of all miners or other persons employed in and about a mine, using gun, blasting powder or other explosives, to have and keep a strong box in which all surplus gun, blasting powder or other explosives in the mine shall be kept, excepting so much as is necessary for immediate use. These boxes shall be kept locked and not opened unless it be to put in or take out powder. Nor must these strong (or powder) boxes be kept nearer than 100 ft. to the place of blasting. And in all dry and dusty coal mines discharging light carbonated hydrogen gas, or in mines where the coal is blasted off of the solid, shot-firers must be employed by the operator of said mine or mines, to fire all shots after the employees and other persons have retired from the mine. And all shots prepared by the miner for the extraction of coal from off of the solid must be so placed, drilled and charged, that the same, when fired, shall perform safely the duty required of such shots; but if the shot-firers find or discover that a drill hole is gripping too much or that it is drilled too much into (what the miners term) 'the tight,' and as may, in the judgment of the shot-firers, prove a windy, blown-out or otherwise dangerous shot, said shot-firers shall there and then condemn such shot as too dangerous to fire and pass the same without firing it. It shall also be the duty of the shot-firers to notify the mine foreman as soon as practicable, when a shot is condemned, who shall in turn attract the attention of the miner or miners responsible for the preparation of said condemned shot, and said miner or miners shall, immediately after returning to work, provide the necessary remedy to render the said condemned shot harmless.

"Section 8827. Penalty.—Any agent, owner or operator of any coal mine in this State violating the provisions of the preceding section shall be deemed guilty of a misdemeanor, and for each offense, on conviction, shall be fined not less than $100 nor more than $250, or by imprisonment in the county jail not less than six months nor more than one year, or by both such fine and imprisonment. Proceedings to be instituted in any courts having competent jurisdiction."

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Bismuth Ores.—I would be greatly obliged if you would give me the address of some firms who purchase bismuth ores.—W. J. D.

Answer.—As bismuth finds its principal use in the manufacture of medicinal compounds, the largest purchasers in the United States are Charles Pfizer & Co., 81 Maiden lane, New York; the General Chemical Company, Broad Exchange Building, New York, and the Smith, Kline & French Company, Philadelphia, Pa.

Chlorination vs. Cyanidation.—Which of these processes is the cheaper for the treatment of a gold ore?—W. A. M.

Answer.—A specific answer to this question would be impossible. It all depends upon the conditions. Each process has its advantages, wherefore in one place chlorination may be the cheaper, and in another cyanidation. Both have been tried in South Africa, and as the outcome the cyanide process reigns. At Cripple Creek, Colo., on the other hand, the chlorination process appears to have come out ahead (at least the United States Reduction & Refining Company is operating only its chlorination mills), although the operations of the Metallic Extraction Company at Florence were technically a great success.

Mechanical Stokers for Roasting Furnaces.—In applying an 'American' stoker to a roasting furnace, it was found that the fire-box was quickly burnt out and the ore would not roast. What explanation can you give?—F. P. W.

Answer.—Probably the stoker was doing just what is claimed for it, that is, effecting a complete combustion of the coal. This would produce the maximum possible concentration of heat in the fire-box, which would naturally be severe on the lining. The ore would not roast, because there was no surplus oxygen in the fire gases, and presumably no air was admitted to the furnace elsewhere. The remedy would be, apparently, to admit a supply of fresh air into the fire-box, which would reduce the temperature there, and also furnish what the ore might require for the combustion of its sulphur. The roasting of a sulphide ore is a chemical process, in which so much air must be supplied as is required by the sulphides. In the ordinary combustion of coal on a grate, a great excess of air passes through the fire, and this is partially available for the combustion of the ore. The 'American' stoker has been successfully used in connection with ore-roasting furnaces at a number of places.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

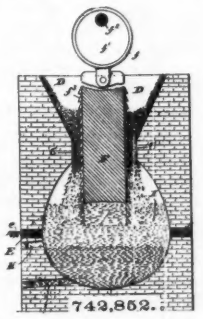
The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared:

Week Ending November 3, 1903.

742,828. PUMP MECHANISM.—Edward C. Brown, Rochester, N. Y. In a pump, the combination with the pump cylinder thereof of a check valve therefor, and a leaf spring having its end reduced to form tongues, the cylinder being provided with slots receiving the said tongues, and said spring serving to close the valve when relieved of pump pressure.

742,830. METALLURGICAL PROCESS.—Oliver W. Brown, Bloomington, and William F. Oesterle, Marion, Ind. A process of simultaneously producing metallic zinc and a carbide, which consists in mixing with the zinc ore carbon and an oxide of a metal having a greater affinity for carbon than for the zinc, and then heating the mixture to a temperature sufficient to produce the products.

742,852. ELECTRIC FURNACE.—William S. Franklin, South Bethlehem, Pa., assignor of one-half to Frederick Conlin, Bethlehem, Pa. In an electric furnace, the combination of a structure having a chamber, a molten conductor, electrodes, one of which is above the conductor, but out of contact therewith, to form an arc, and means for reciprocating said electrode to feed into the furnace the material to be treated.



742,863. ELECTROLYTIC APPARATUS.—Edouard Hannon, Brussels, Belgium, assignor to the Solvay Process Company, Syracuse, N. Y. An electrolytic apparatus comprising a receptacle for receiving the electrolyte, a fluid electrode and a second electrode, and means for causing the surface of the fluid electrode adjacent to the electrolyte to flow without agitation in a substantially horizontal plane from the contiguous portion of the fluid electrode.

742,864. ELECTROLYTIC PROCESS.—Edouard Hannon, Brussels, Belgium, assignor to the Solvay Process Company, Syracuse, N. Y. An electrolytic process, the same consisting in passing an electric current through an electrolyte and a fluid electrode adjacent thereto, in removing the surface of the fluid electrode adjacent to the electrolyte from the remaining portion of said electrode, and in moving the electrolyte along said adjacent surface of the fluid electrode during the removal of said surface and in the same direction as that of the movement thereof.

742,865. ELECTROLYTIC PROCESS.—Edouard Hannon, Brussels, Belgium, assignor to the Solvay Process Company, Syracuse, N. Y. An electrolytic process, the same consisting in passing an electric current through an electrolyte and a fluid electrode electrically in contact therewith, the adding a fresh supply of the material forming the fluid electrode to the side of said electrode opposite to its side adjacent to the electrolyte, and in removing by gravity the surface of the fluid electrode adjacent to the electrolyte from the remaining portion of the electrode without mixing the adjacent surfaces of said electrolyte and fluid electrode and without agitating the remaining portion of the electrode.

742,887. QUICKSILVER-ORE-REDUCING APPARATUS.—Frederick C. Meyer, Kansas City, Mo. The combination of a furnace for the reduction of ores, a water tank having a discharge pipe, a cupola having its lower edge submerged in the water of the tank and provided at its front end with an opening containing an absorbent packing in contact with the water of said tank, and at its rear end with a gate-controlled opening and a vent pipe, a fan casing having a spout projecting into the cupola through the packed opening, a pipe connecting the furnace and said casing, and a driven fan in the latter to draw the ore fumes and products of combustion from the furnace and discharge them through the said spout onto the water in the tank.

742,889. CONCENTRATOR.—John J. Montgomery, Santa Clara, Cal. In a concentrator the combination of a concentrating table, means for vibrating said table in the direction of the travel of the material thereon, means for supplying the material to one end of said table, supports for said

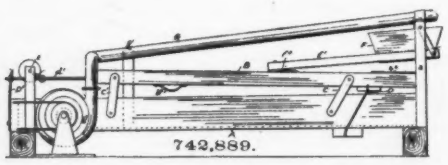

742,889.

table inclined to its surface at an angle against the direction of the travel of the material thereon, a spring to compensate the downward pull of gravity on the table, discharges for the tailings through the table at points throughout its length, and discharges for the concentrates at the end of the table opposite to that at which the material is supplied.

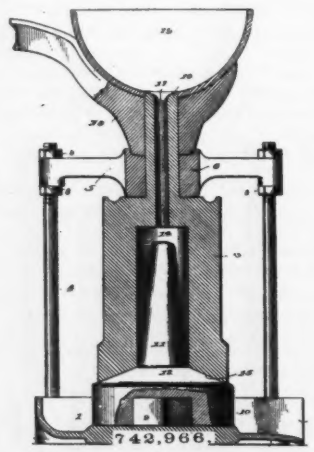
742,919. PEEP-HOLE ATTACHMENT FOR BLAST FURNACES.—Adam L. Smith, Pittsburg, Pa. An attachment comprising a plate, a detachable seat carried thereby, a hinged member carrying an eyesight provided with a head, and means for forcing the head against the seat.

742,924. MANUFACTURE OF ARTIFICIAL STONE.—Charles W. Stevens, Harvey, Ill. An improvement in the manufacture of artificial stone, which consists in providing a mold with a coating of hardening material, filling the mold with a stone mixture, and subjecting the stone so formed, with the coating of hardening material adherent to it, to the action of heat.

742,949. PUMP.—Charles C. Worthington, Dunnfield, N. J. A pump having a cylindrical plate inclosing the pump plunger and pulsation chambers with suction and force valves therein arranged circularly about the plunger, an outer cylindrical casing removable without removing the pump ends, and partitions dividing the space between the plate and casing into suction and force chambers.

742,962. SIGNAL SYSTEM FOR MINES.—Newton K. Bowman, North Lawrence, Ohio. In a signaling system for mines, the combination with a plurality of branch tracks running in different directions and connecting at different points and leading into a main track, of levers located at the several junctions and constituting visual signals and operating handles for the system and adapted to be manually operated to indicate by their position safety or danger, and connections between the levers to cause them to operate in unison, some of the connections leading from an intermediate station to several of the stations.

742,966. QUARTZ MILL.—John Y. Byers, Descanso, Cal., assignor of one-half to John F. Forward, Descanso, Cal. In a quartz mill, the combination with a base having a non-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circular projection, of a grinding member supported detachably upon said base, and having its lower end expanded to form a pulverizing surface and provided in its under side with a non-circular recess extending into the said expanded portion and adapted to engage the non-circular projection of the base to retain the grinding member fixedly in position upon the latter.

742,982. CRUSHING AND PULVERIZING MILL.—Edwin C. Griffin, Newton, Mass. In an apparatus of the class described, co-operating fixed and rotatable annular dies, and a pair of operatively-contacting crushing rolls to travel upon the dies, operation of the rotatable die imparting planetary rolling motion to the said rolls.

742,987. WIRE-DRAWING MACHINE.—James A. Horton, Providence, R. I., assignor to Iroquois Machine Company, New York, N. Y. In a wire-drawing machine, a die, a drum, a wire-forwarding means adapted to slip circumferentially on said drum and frictionally driven at the speed required by the call or tension of the wire, and means whereby the friction surfaces of the drum and the wire-forwarding means may be uniformly and continuously lubricated.

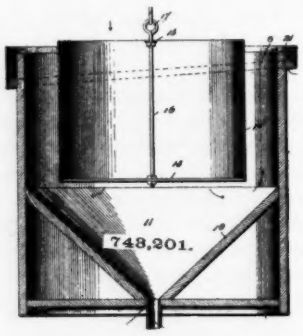
743,014. MILL FOR CRUSHING ORES.—Andrew B. Mouck, Fargo, N. D. In a crushing and pulverizing mill the combination of a drum having side plates with central openings, one of the plates having a flared annular flange on its outer side, means to support and rotate the drum, a muller-roller disposed in the drum and having movable bearings, plates carried by the bearings and forming closures for the said openings, a feed-hopper carried by one of the plates, and a discharge-hopper also carried by the same plate and having an opening in its inner side the edge of which is covered by the said flange.

743,051. PROCESS OF PRODUCING ASPHALTIC PAVING COMPOSITION.—Joseph H. Amies, Philadelphia, Pa., assignor to Amies Asphalt Company, Philadelphia, Pa. A process of producing a composition for paving, etc., which consists in first subjecting powdered asphalt to the macerating effect of crude petroleum-oil for a sufficient period to form a paste, and then reducing the paste to a liquid condition by the action of heat.

743,070. CONVEYOR CHAIN.—Michael Garland, Bay City, Mich., assignor to the M. Garland Company, Bay City, Mich. A conveyor-chain link comprising two side bars, and a cross-bar formed integral therewith and having its ends projecting beyond the side bars; a rib on each projecting end; a socket formed in the end of each side bar, said socket being provided with a recess to receive said rib.

743,188. ACCUMULATOR PLATE OR GRID.—Johannes von der Poppenburg, Charlottenburg, near Berlin, Germany. An accumulator plate, comprising a non-conducting frame, and a conductor-grating provided with bendable arms having interlocking connection with said frame.

743,201. ORE-SLIME SETTLING AND CLASSIFYING APPARATUS.—Frederic W. Sherman, Park City, Utah. In a settling apparatus, a cylindrical tank having an open top and a conical bottom with a settlings-opening at the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lowest point of the bottom, an open-ended cylindrical feed-tube arranged concentrically within the tank with its lower open end terminated short of the conical bottom of the tank and its upper open end projected above the top of the tank, the area of the feed-tube being equal to that of the annular space between the feed-tube and the tank, cross-bars at the top and bottom of the feed-tube, a central rod connecting the cross-bars, and a hanger connected to the upper end of the rod to suspend the tube within the tank.

743,202. APPARATUS FOR MIXING MINERAL OR OTHER DRY SUBSTANCES.—Charles W. Speirs, London, England, assignor to the Morgan Crucible Company, Limited, London, England. In an apparatus for mixing substances, the combination with a stationary horizontal inclosing casing, of a horizontal shaft extending therethrough and rotatable therein, two oppositely-pitched spiral feeding devices secured to and rotating with said shaft, one of said devices having its external diameter within the internal diameter of the other throughout its entire length, the spiral feeding device of smaller diameter having a greater pitch than the outer and larger spiral.

743,209. PROCESS OF OBTAINING SODIUM SULPHIDE.—Herbert H. Wing, New Brighton, N. Y. A process of obtaining sulphite of soda which consists in smelting a matte with a sulphate of soda and carbon, whereby a mixed sulphide product is obtained, then cooling it, then grinding, leaching and agitating it in the presence of copper oxide, whereby substantially all of the soda contained in said mixed sulphide product is obtained in solution as caustic soda, then separating said solution from the insoluble residue and then bringing gases containing sulphur dioxide into contact with said solution of caustic soda whereby sulphite of soda is produced.

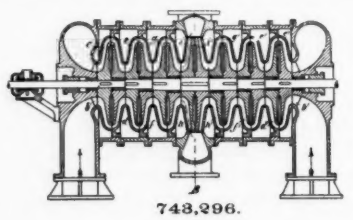
743,214. CRUCIBLE ASSAY FURNACE.—Charles N. Anthony, Organ, N. Mex. A crucible assay furnace having blast and flue openings at opposite ends and inwardly-projecting upright baffles in its opposing sides, forming a plurality of communicating chambers intermediate the blast opening and flue, and also forming an opening between said chambers, co-extensive in height therewith, said chambers being diminished in width progressively toward the flue.

743,215. BRICK KILN.—John W. Aregood, Chicago, Ill. The combination with a kiln, of a grate for generating heat for burning the material in the kiln, and means for varying the area of the surface of said grate to regulate the size of the fire according to the condition of the material in the kiln.

743,218. MANUFACTURE OF PORTLAND CEMENT.—Henry K. G. Bamber, Greenhithe, England. A process of conditioning and regulating setting time of cement consisting in bringing steam in contact with the cement during grinding.

743,349. APPARATUS FOR LIQUEFYING AIR AND SEPARATING OXYGEN THEREFROM.—Edgar C. Thrupp, Walton-on-Thames, England. In an air liquefying apparatus, air-compressing means, means for removing the heat of compression, a counter-current temperature-interchanger for cooling the highly-compressed air, means for expanding the cooled and highly-compressed air, and connections to discharge the gaseous portion of the exhaust from said expansion means into and through said interchanger in the opposite direction to the current of high-pressure air to be cooled, in combination with an auxiliary turbine, connections supplying to the latter air at a lower pressure than the high-pressure air to be liquefied, and an exhaust from said auxiliary turbine connected to the interchanger at the same end of the latter as is the exhaust from the expansion means.

743,296. CENTRIFUGAL HIGH-PRESSURE PUMP.—Paul Kugel and Victor Gelpke, Zurich, Switzerland. A centrifugal pump comprising a casing, a shaft, guide-wheels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secured to the casing, working wheels on the shaft, the said guide-wheels and the said working wheels each having approximately S-shaped channels with vanes therein, the inlets and outlets from said channels being parallel with the axis of the shaft.

743,406. UNIVERSAL COUPLING FOR CONVERTERS.—Theron H. Tracy, Denver, Colo. The combination with a converter mounted to rotate, and a blast-conduit, of a universal-coupling connection between the converter and the blast-conduit, and means connected with the coupling for disconnecting the latter from the converter by a longitudinal movement.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending October 17, 1903.

18,015 of 1902. ZINC-WHITE MANUFACTURE.—B. H. Thwaite and T. J. Denny, London. Making zinc white by oxdizing metallic zinc in an electric furnace with a current of air passing through.

20,084 of 1902. PRODUCING METALLIC CALCIUM ELECTROLYTICALLY.—Elektrochemische Werke, Bitterfeld, Germany. Producing metallic calcium by the electrolysis of fused calcium chloride, the cathodes used being small compared with the anodes, and the temperature being kept just below the melting point of the metallic calcium.

20,657 of 1902. DEPOSITING COPPER FROM SOLUTION.—B. Comba, Turin, Italy. Method of hastening the deposition of copper from solutions by means of iron, by using a small electric current which improves the method of dissolving the iron.

21,391 of 1902. REFINING MATTE.—A. L. A. Conein, Paris, France. Refining mattes by introducing a blast of superheated steam and air and a hydrocarbon, and adding silica or lime to the charge.

22,282 of 1902. CLEANING BLAST-FURNACE GASES.—C. H. Fowler and E. A. Medley, Huyton, Lancashire. Improved spraying apparatus for cleaning blast furnace and coke oven gases from solids and tar for use in gas engines.

26,198 of 1902. COAL CUTTER.—F. Eckersley, Wakefield. Improved appliances for securing cutters in coal cutting machines.

14,305 of 1903. BLAST HEATER FOR CUPOLAS.—Albert Seydel, Fretigny, France. Method of utilizing the waste heat of cupola furnaces for heating the blast for the tuyeres.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of the ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers non-resident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep the ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Mr. Robt. T. Hill is at Naco, Arizona.

Mr. Bertram Hunt is now at Puntarenas, Costa Rica.

Mr. A. A. Merlett has returned to London, from West Africa.

Mr. R. M. Raymond returned to El Oro, Mexico, on November 9.

Mr. A. B. Frenzel, of Denver, has returned from New Mexico.

Mr. Ben. B. Lawrence has returned to New York from Arizona.

Mr. John Hays Hammond is visiting the De Lamar mines, in Nevada.

Mr. Geo. A. Schroter is now at the Dolores mine, Chihuahua, Mexico.

Mr. J. Burn Murdoch is on his way from London to British Columbia.

Mr. Chester W. Purington and Mr. Newton B. Knox are at Cananea.

Mr. James I. Cowan left Boston for Colorado Springs on November 10.

Mr. E. B. Van Osdel, of Spokane, has been in New York during the week.

Mr. Henry F. Lefevre is in New York, after a sojourn in Michoacan, Mexico.

Mr. E. Gybbon Spilsbury returned to New York from Mexico on November 9.

Mr. Francis Freeland has resigned as manager of the Smuggler mine at Aspen.

Mr. W. S. Ward, field commissioner to the St. Louis Exposition, is visiting Denver.

Mr. John Iles, late manager of the South Kalgurli mine, at Kalgoorlie, is in London.

Mr. Harry Mead, of San Francisco, has left that city for an extended tour in Mexico.

Mr. John Herron, manager of the Tomboy mine, at Telluride, Colo., is in New York.

Mr. Jay P. Graves, of the Granby Consolidated Co., has returned to Spokane from Montreal.

Mr. C. W. Kempton, of New York City, has gone to Santo Domingo, on professional business.

Mr. E. R. Schoch is now manager of the Wassau Mining Co., on the Gold Coast, West Africa.

Mr. S. I. Hallett was in Denver recently from Idaho, and will soon go to Central America.

Mr. Bernard MacDonald is general manager of the Cornucopia mines, near Baker City, Oregon.

Mr. H. J. Allen has been appointed general manager of the United Verde Mining Co., at Jerome, Ariz.

Mr. F. W. Bradley was in New York for a few days, and is now on his way to Queretaro, Mexico.

Mr. W. J. Sharwood is in charge of the cyanide plant of the Montana Mining Co., Marysville, Mont.

Mr. John R. Lucas is temporarily in charge of the Goodhope Mining Co.'s property at Phillipsburg, Montana.

Mr. Edwin Ludlow, manager of the Mexican Coal & Coke Co., at Las Esperanzas, Mexico, is visiting New York.

Mr. Allan Greenwall, editor of *The Colliery Guardian*, is expected to reach New York early in November.

Mr. John B. Farish was in New York for the past two weeks, and is now on his way to Nogales, Mexico.

Mr. J. S. White, of New York City, has been examining mining properties near Sneffels, Ouray county, Colorado.

Mr. August Raht, consulting metallurgist to the American Smelting & Refining Co., was at Denver last week.

Mr. J. Morgan Clements, recently of Madison, Wis., is now in New York, where he expects to remain for some time.

Mr. Charles Newhall, of Ouray, Colo., has been engaged as superintendent at the Isolde mine, near Lake City, Colo.

Mr. E. A. Smith, of the Mexican Gold & Silver Recovery Co., Mexico City, sailed by the *Majestic* on November 11.

Mr. Chas. Butters has left New York for San Francisco, and will proceed shortly to the Minas Prietas, Mexico.

Mr. R. T. Bayliss, chairman of the Exploration Co., Ltd., returned to London by the *Celtic*, which sailed on November 13.

Mr. F. Williams Bawden, of Plymouth, has returned to England, after extensive journeys in South American mining regions.

Mr. Wm. Griffith, of Scranton, was in New York on November 6, on his way to an inspection in the iron regions of Minnesota.

Mr. Colin McIntosh, manager of the Big Indian mine, near Helena, Mont., will leave for South Africa the latter part of December.

Mr. Hartwell Conder, of Launceston, Tasmania, is directing operations at the Crowl Creek mine, near Cobar, in New South Wales.

Dr. A. F. Wilder, lately state geologist of North Dakota, has accepted the professorship of geology in the State University of Iowa.

Mr. J. Cuthbert Welch, formerly of the Canadian Smelting works at Trail, B. C., is now superintendent of the Le Roi smelter at Northport.

Mr. Claude Flint, manager of the Crackerjack property, Hump, Ida., has resigned on account of ill health. Mr. George B. Cooper succeeds him.

Mr. S. E. Bowlby, formerly with the Homestake Mining Co., South Dakota, is now superintendent of the Drumlummon mines, Marysville, Montana.

Mr. D. Davies has been appointed comptroller of the Crow's Nest Pass Coal Co., with office at Fernie, B. C. His duties include those of purchasing agent.

Mr. Charles M. Hampson, formerly with the Colorado Iron Works Co., has accepted a position with the Geo. Leyner Engineering Works Co., of Denver.

Mr. Louis A. Wright, of El Paso, Tex., recently returned from an extended trip into the Pinos Altos district of Chihuahua, Mex., and is now in Sonora.

Mr. S. B. Sheldon, superintendent of the Illinois Steel plant at Joliet, Ill., has resigned to accept a position with the Lackawanna Steel Co. at Buffalo.

Mr. Robert A. Quinn will succeed Mr. Morris Williams as manager of the Pennsylvania Railroad coal companies, with headquarters in Wilkes-Barre, Pennsylvania.

Mr. S. C. Hazelton, formerly with the American Smelting works at Trail, B. C., is now superintendent of the United States Mining Co. at Bingham, Utah.

Prof. E. C. Perisho, of the State Normal School of Plattsville, Wis., has been appointed state geologist of South Dakota, and professor of geology in the State University.

Mr. Bertram Blount has removed his office, 76 and 78 York street, Westminster, London, the firm of Stanger & Blount having ceased, owing to the death of Mr. W. Harry Stanger.

Mr. D. A. Elliott has resigned as millwright at the De Smet mill, Central City, S. D., and goes to West Africa in the employ of the Bibiana Gold Mining Co. Mr. James Miller succeeds him at the De Smet mill.

Mr. Albert Filmore Crank, chief engineer of the Blaisdell Co., of Los Angeles, Cal., has sailed from London, England, for Cape Town, and will have charge of the Blaisdell Co.'s South African business at Johannesburg.

Gen. Isaac J. Wistar, vice-president of the Pennsylvania Railroad's anthracite coal companies, has resigned and Mr. Morris Williams, general manager, has been made president. Gen. Wistar has been elected a member of the boards of the different companies, vice Mr. Wm. A. Patton, resigned.

Mr. Irving H. Raynolds will shortly retire from the Allis-Chalmers Co., and the duties of the chief engineer will be assumed by the engineers in charge of the various departments, these engineers availing themselves of the advice of Mr. Edwin Raynolds, consulting engineer of the company.

Mr. Geo. T. Cutts, of St. Louis, vice-president and general manager of the Consolidated Coal Co., of St. Louis, the largest coal mining company in Illinois, has resigned. Mr. Cutts will rest for three months, at the end of which time, it is rumored, he will accept a position which carries with it even greater responsibilities.

Mr. Otto C. Burkhart, at one time on the staff of the ENGINEERING AND MINING JOURNAL, and for some time past assistant superintendent of furnaces for the Pennsylvania Steel Co., at Steelton, has been appointed superintendent of the Andover Iron Co., at Phillipsburg, N. J. Mr. Burkhart has had charge of the reconstruction of the company's furnaces, and is now superintending their operation.

SOCIETIES AND TECHNICAL SCHOOLS.

ENGINEERS' CLUB OF PHILADELPHIA.—At the meeting on October 17, 60 members and visitors were present. Mr. Henry Hess read a paper on "Foundry Costs; their Analysis and Reduction." Mr. Hess stated that in order to manage a foundry economically it is necessary to know accurately the various elements of expenditure and having these to analyze their relation to one another and to the product. The manager is then in a position to at once check any rising tendency of the cost or to bring about a reduction. Mr. Hess divided the elements of cost into a few main items (it being understood that for actual work a subdivision more in detail must be used) as follows: general expenses, fixed salaries, power, miscellaneous materials, labor, pig and other charging metal, smelting material, light and recovered material. Under each of these heads Mr. Hess had prepared a diagram showing the ideal cost per 200 lb. of castings for an output of from 25 to 125 tons of castings per week. The total ideal cost of production would be represented by a combination curve based on the elements of the whole series of curves. The figures used for the various curves were merely illustrative and no attempt was made to provide a record of actual or proper cost. Experience must be relied upon to gradually bring about correct values for each item. The cost per pound rises when the product is small and decreases with an increasing output, and by means of the diagrams it was shown how to determine whether this increase or decrease in cost followed the ideal curve. In case a difference was found between the actual and ideal cost of production an analysis would be expected to show under one or more of the various heads an excess cost, and if this could be reduced to the ideal cost the record for the following week would probably show the actual and ideal costs approaching each other. Mr. Hess further stated in discussion that he had found by this method, in one case, that a decreasing output had been cast so economically as to actually reduce the cost of production.

INDUSTRIAL.

Nearly 300 men employed in the rolling department of the American Steel & Wire Co., Worcester, Mass., have been laid off.

The Allis-Chalmers Co. has secured a contract for mining machinery from the Takorvadi Harbor & Railroad Co., Ltd., Gold Coast of Africa.

The Blaisdell Co., of Los Angeles, Cal., reports having 40-ft, and 30-ft. class A excavators under construction at Erith, England, for shipment to South Africa.

The Niles-Bement-Pond Co. has taken the contract for most of the machine tools for the new shops of the Canadian Pacific Railroad. The amount is about $160,000.

A. & Z. Daw, of 11 Queen Victoria street, London, E. C., recently shipped a very large air compressor to Natal, South Africa. This compressor specially cleanses the air used.

The Holly Manufacturing Co., manufacturers of pumping engines, is to be removed from Lockport, N. Y., by the International Steam Pump Co., to the Snow Pump Works, at Buffalo.

The Wellman-Seaver Morgan Co. states that it is moving the Akron office of the company to the New England building, Cleveland, O., and that all correspondence and papers should hereafter be sent to the Cleveland office.

The foundry of the Ingersoll-Sargent Drill Co.'s plant at Phillipsburg, N. J., is practically completed. The old foundry at Easton, Pa., will be torn down and some of the brick in the buildings used in the construction of the new plant at Phillipsburg.

The West Virginia Boiler & Machine Co., of Mannington, W. Va., has been incorporated to make all kinds of mining and drilling machinery, with a capital of $100,000. Incorporators are V. H. Debendarfer, LeRoy Taylor, of Mannington; I. E. Carnahan and W. M. Belcher, of Canton, and R. R. Carnahan, of Smithfield, W. Va.

The Fairbanks Co. has received an order from the Western Fuel Co., of Nanaimo, B. C., for a 400 h. p. Rand air compressor. The plant is to be completed by Jan. 15, 1904. The company has also received an order for a similar plant of smaller size for the Imperial Gold Mining Co., of Okanogan,

Wash., and for a large stamp mill on Skukumchuck river.

Fairbanks, Morse & Co., general sales agents for Ellspass mills, recently sold one of these mills to the Gothic Mining Co., at Gothic, Colo., and one to the Rio Grande Mining Co., Jasper, Colo. This firm is also building a similar mill for the Iowa Chief Mining Co., at Golconda, Nev.; another for B. L. Berkey, El Paso, Tex., and another for the Cyclone Mining Co., Baker City, Oregon.

The plant of the Orford Copper Co., at Constable Hook, N. J., was visited by fire November 9. The fire was confined chiefly to a frame building at one corner of the works, in which copper, nickel and other material were stored. The working plant was not damaged at all, and operations will not be curtailed in any way. The loss, it is estimated, will not exceed $100,000, and may be considerably less, all covered by insurance.

The Columbia Fire Brick Co. has been organized by men who will erect a plant at Strausburg, O., to have a capacity of 20,000 brick per day. The company is composed of H. A. Wise, Canton, president and treasurer; D. J. Sinclair, Steubenville, vice-president; E. A. Bowman, Canton, secretary; Fenmore Roudebush, Canton, assistant secretary; E. J. Howeter, Strausburg, superintendent. The company owns large deposits of clay. The capital stock is $100,000.

A centrifugal pump of novel design will be exhibited at the St. Louis Exposition by Henry R. Worthington, of New York City. This pump marks a distinct departure from the usual centrifugal practice in that it will be capable of delivering about 500 gal. of water per minute against a head of 250 lb. per sq. in., and with high efficiency. The pump is of the type known as the multi-stage, turbine centrifugal, and differs in many respects from the centrifugal pumps with which engineers have been familiar.

The Hendrie & Bolthoff Manufacturing & Supply Co. is installing a double-drum electric hoist with a 50 h. p. Stanley induction motor at the mine of the Mayflower Mining Co., near Telluride, Colo. A pair of electric hoists, having Stanley induction motors, has been shipped to the Aparecida mine in Mexico. One of these is a 50 h. p. double-drum hoist and the other a 20 h. p. single-drum. An electrically operated air compressor and electric pump, both having the Stanley induction motors, have also been sent to the Aparecida mine by the company.

The American Structural Steel Co., of Pittsburg, is about to put its plant at Carnegie in full operation. The plant is electrically equipped throughout, each machine being driven by an individual motor of Crocker-Wheeler make. The power plant is in duplicate, containing two 150 h. p. boilers, a Stilwell-Bierce-Smith-Vaile feed water heater, two 150 h. p. Harrisburg engines, direct connected to two 250-voltage Crocker-Wheeler generators, and a Rand compound compressor. The monthly output is rated at 1,200 tons. The company has a paid-up capital of $200,000. C. A. Ralph is president, J. T. Joyce vice-president, and H. B. Shidle secretary and treasurer. The directors also include George B. Milliken, Scott A. White, George W. Miller and John Kearns.

TRADE CATALOGUES.

The Smooth-On Manufacturing Co., of Jersey City, N. J., is sending out circulars calling attention to the merits of its Smooth-On compounds, particularly to the use of Smooth-On iron cement No. 1 for repairing leaky boilers.

The Fairbanks Co., of New York City, is sending out circulars calling attention to the Dart malleable iron, bronze seat, ground joint union couplings, both plain and galvanized, also the Dart cast and malleable iron, bronze seat, ground joint flange unions, which the company claims insure an absolutely tight joint.

A useful and handsome pocket memorandum book is being sent out by Arthur Koppel, manufacturer of narrow gauge railway materials, of 66 and 68 Broad street, New York. It is shaped to fit the vest pocket. Twenty-six of the pages are devoted to information on various subjects and the balance are blank for memorandum. The cover is of celluloid with a picture in the center of a standard steel side dump car, dumping to both sides, which is one of the many different styles of cars manufactured by this firm. A copy of this book will be sent upon request, and to anyone interested a complete catalogue of railway materials.

Catalogue R, on mining machinery, published by the Mecklenburg Iron Works, of Charlotte, N. C., is a pamphlet of 48 pages, containing detailed descriptions of the machinery made or handled by this old-established concern, which has been actively engaged in mining and milling operations for over 40 years. The list of the company's wares includes horse whims, boilers, engines, hoisting engines, pumping outfits, including Cornish pumps, air compressors and drills, rock crushers, stamp batteries, classifiers, concentrating tables and belts, hydraulic giants and elevators, etc. The company installs plants using the barrel chlorination process perfected by Mr. Adolph Thies, of the Haile Gold Mines.

The American Spiral Pipe Works, of Chicago, Ill., issues a little cloth bound pamphlet of 40 pages, describing Taylor's spiral riveted pipe. This pipe is made in sizes from 3 to 40 in. diameter. The company states that it uses the best grade of sheet steel, that it has given particular attention to riveting the joints of the pipe, that the pipe is thoroughly protected by an asphalt coating or by galvanizing, and hence, being unaffected by acids, earth salts, electrolysis, etc., is specially suited for water-works, hydraulic pipe lines, etc. The company also says that practical service has shown the merit of the pipe for dredging purposes. The pipe is also used for exhaust steam work and for compressed air purposes. It is furnished in lengths of 20 ft., and with flange fittings or slip-joint connections.

A finely printed and handsomely illustrated pamphlet of 164 pages is issued by the John A. Roebling Sons' Co., of Trenton, N. J. It gives a sketch of the development and present capacity of the company's works at Trenton, and contains a price-list of a great variety of wire rope and wire rope fastenings, sheaves, etc.; also mentions the uses of wire rope for ferries, underground haulage, logging and aerial cableways. The pamphlet contains illustrations of some notable suspension bridges, including the new East River bridge at New York, in the construction of which Roebling wire cables were used. The company not only makes steel and iron wire rope, but also copper trolley wires, galvanized telegraph and telephone wires, silicon bronze wires for trolley lines, etc. The pamphlet contains tables showing the size of various wire gauges, the weight per foot of copper and steel wire, etc.

The Archer Iron Works, of Chicago, Ill., is calling attention to the line of barrows, lumber carts and mining cars it makes. The company attributes the success of its barrows to the Archer wheel, which is so constructed that it cannot be broken down or side-racked. The spokes are ¾-in round, three being strongly welded together and spread to meet the rim of the wheel. The tires are 1½ by ⅜ in., and the spokes are riveted to the rims with ⅜-in rivets deeply countersunk. The Archer works began 10 years ago with one barrow for handling mortar, and now makes 35 kinds, for handling all sorts of material; also a coal charging barrow of one ton capacity, built with 44-in wheels, roller bearing. This is used by a number of railroads for coaling engines. The company states that it is prepared to build to specification or to furnish information and plans for any kind of appliances for handling material.

The Pinder concentrator is described in a 32-page pamphlet published by the Joshua Hendy Machine Works, of San Francisco, Cal. This concentrator is of pan type, having the spiral riffles and a flexible bottom. A slight undulatory motion is given the pan, giving a top washing to the sand, the motion differing greatly from the jerk or bump of a concentrating table. The driving speed is 240 revolutions a minute with a 1-in. stroke. To ensure the pan retaining its shape and position under its load of pulp and water while in motion it has a system of six movable bearings kept in position by helical springs set to a proper tension. The bottom of the pan is of selected redwood staves, covered with a special make of linoleum. The 56 tapered riffles are of rolled sheet brass tacked to the linoleum by small brads. The minimum capacity of the concentrator is given as about 24 tons per 24 hours, and the maximum rate is between 30 and 40 tons, though in special cases it has handled about 50 tons. Besides describing the concentrator the pamphlet has some notes on the determination of concentrating ores, on amalgamation, and a table of specific gravities and the metallic value of various minerals and ores.

SPECIAL CORRESPONDENCE.

Denver. Nov. 7.

(From Our Special Correspondent.)

For the month of October the gold receipts at the United States Mint, Denver, were $783,551, as compared with $1,300,806 for October last year, the decrease being accounted for by the closing down of the chlorination mills at Colorado City and Florence and the stamp-amalgamation mills at Telluride, the operations of all of which have been interrupted by the miners' strikes.

On the afternoon of October 31, the men employed in and about the Tomboy mine near Telluride, nearly 100 in number, engaged on development work, and in keeping up the mine, were ordered out by the Miners' Union. The union men obeyed, while some of the non-union men, thinking there might be trouble, also left, but others remained at work. The Tomboy has installed two large searchlights on the top of its buildings, and every night these are turned on the surrounding country. The property is guarded and every precaution is being taken. The Smuggler-Union Co. has also installed a searchlight. Governor Peabody sent State Attorney-General Miller to Telluride and adjacent places, to investigate and report on the local strike situation, and some of the leading mine operators of the district have had conferences during the past week with the Governor in Denver. It is reported that the operators propose to resume operations so soon as they can have military protection.

No settlement has yet been arrived at to avert the threatened coal miners' strike called for November 9. The unions demand an eight-hour day, a 20% advance in wages on tonnage and day's work, and better conditions of ventilating the mines. They are officially promised support or employment elsewhere by the United Mine Workers of America, through John Mitchell, the president, and other officers. "Mother" Jones, from Pennsylvania, has been in Colorado for a week past, and it is reported that John Mitchell will come and take direction of the strike.

Notices have been posted by the operators at all of the mines in the southern coal-field, ordering the employees to report for work as usual on Monday morning next, or consider themselves discharged, never again to be employed there. The officials of the Colorado Fuel & Iron Co. and other large coal operators in the southern field express themselves willing to meet deputations composed of their own employees, but absolutely decline to deal with or recognize the unions. For several days union miners, who do not care to be mixed up in the strike, have been quietly leaving the district, in search of work elsewhere, and, if the strike order is obeyed, many more will follow their example.

The Northern Coal & Coke Co. controls two-thirds of the mines in the northern coal-fields, and practically the situation there. It is to-day reported that there will be no strike at present in the northern coal-field, as the result of an agreement arrived at yesterday when concessions were made on both sides. The only point not settled was the offer of the operators to increase the pay of the men, if they would forego the demand for an eight-hour day. Such offer will be taken up in the unions and voted upon. It was shown by the books of the operators that some of the men drew pay checks amounting to $80, each semi-monthly pay-day. It was also shown that the threatened strike was not because of actual need among the men, or because the companies were getting more than their share of profits of mining.

The pay-roll of the Colorado Fuel & Iron Co. for the month of October was $339,469, being about $24,000 more than that for September.

San Francisco. Nov. 7.

(From Our Special Correspondent.)

The dry weather has had a very bad effect on the mining industry throughout the State, as numbers of mines and mills have had to close down, some of them over two months ago, lack of water being the cause.

Residents of Benicia, Solano county, have commenced a crusade against the Selby Smelting & Lead Co. by asking the supervisors to declare the works a nuisance, owing to the fumes. The works are at Selby, on the bay shore a few miles below Benicia, but on the opposite side of the Carquinez straits. The Selby Co. has occupied the site for many years, and has the largest smelting plant on the Pacific slope. The district attorney has been instructed to begin proceedings for the abatement of the smelter fumes. In Alameda, Alameda county, where the vegetable men procured a temporary injunction against the Pyne Smelting Co., the company has answered by saying it has been there three years and no complaint has been made until lately; that the location is especially adapted for a smelting plant, which has been conducted in a well-regulated manner, so as not to impair the reasonable comfortable enjoyment of property in the vicinity. It is denied that the sulphurous fumes are liberated to the injury of vegetable life. These are the only two smelters at present operating on the shores of San Francisco bay.

The State Anti-Debris Association is ready to submit briefs in the case of Sutter county against Geo. C. Sargent, and has served injunctions against certain other miners near Gold Run, Placer county. They are also considering plans for watching hydraulic miners to prevent them beginning work when the rains come. This association makes it a business to stop hydraulic mining whenever it can.

The Southern Pacific Co. has acquired by purchase 5,000,000 shares of the stock of the Associated Oil Co. at a stated price of 30c. per share. The stock was that held by the Reed Crude Oil Co. and the San Joaquin Oil Co. The Reed Co. gets $840,000 of the cash paid, and the balance goes to the other company. These two companies are among those which were merged into one great concern some time ago, receiving stock for their holdings. The present purchase by the railroad is for cash, and other purchases of a similar nature are pending. The lands are all in Kern county. Over 20 of the companies are under

one control—the Associated—which made it the largest holder of productive oil-lands in the State, and also the largest producer. It could easily increase production did the market warrant. The Southern Pacific requires many million barrels of oil yearly for fuel on its engines, and for this reason is buying up producing fields. The Bear Flag Oil Co., of the same combination, sold its holdings to the railroad some time since.

The business men of Randsburg, Kern county, where a miners' strike has been going on for some months, have issued a statement to the effect that the Yellow Aster Mining Co. has been running steadily 130-stamps for the past three weeks, with about 200 men at work. The statement also says that men looking for work should disregard sensational articles which are published contrary to these facts. The union men are not in any way interfering with work, but the town is being held back by reports that the mines are not running.

The miners' union at Angels announced that its men would not work with non-union men after October 28, but what action will be taken by the mine-owners is as yet unknown.

Because a few men were laid off at the smelters of the Mountain Copper Co., Keswick, Shasta county, owing to some changes in the methods of handling and smelting ore, there has been an unfounded rumor that the company had decided to shut down the plant.

It is announced this week that first payment has been made in this city by the Venture Corporation, of London, for the Dolores mine, in Chihuahua, Mex. The price is said to be about $1,000,000. Most of the stock was owned by P. Geo. Gow, E. A. Stent, George Beveridge, A. D. Harrison, Charles O'Kell and others, of this city. Mr. Gow was formerly the manager for the Jumper Gold Syndicate, of Tuolumne county. Mr. Beveridge is the man who sold to employees of the mint in this city the Santa Rosalia mine, of Sonora, which paid them dividends for a long time.

Both in El Dorado and Mariposa county there is considerable activity in the development of copper properties. In Alpine, Trinity and Siskiyou large deposits have been found, but never brought to a producing stage; in fact, no capital of moment has been put into them. Just now, however, in Mariposa and El Dorado a number of copper claims are being opened, and the same may be said of Plumas. The trouble appears to be that the owners have not enough money to open the deposits or erect reduction works, but ask prohibitive prices.

The finding of a $3,000 nugget in Siskiyou county this month shows that California has not passed its "nugget days," but the gravel now worked mainly carries fine gold, and few nuggets are found.

The gold yield from the dredging industry has more than doubled within the past year. At Oroville alone there are 26 dredges now busy. In other counties than Butte there are several at work, and several are being built. The first investment necessary is such that only wealthy men or companies can undertake dredging, the machines alone costing $60,000, or thereabouts. The ground is usually in places which have been for years under cultivation for orchard or other agricultural work, and is not as cheaply acquired as the usual run of ground.

The State mineralogist is busy in preparing an exhibit for the coming fair at St. Louis, and has men gathering specimens for exhibition. He has planned a fine arch for the entrance to the mining exhibit to be made of California building stones. Several of the counties have made appropriations in addition to that made by the State, but most of the money will be used for buildings and other products than those of mining.

Prof. S. B. Christy, of the mining department of the University of California, has been requested to prepare an exhibit for St. Louis to represent the work of all land-grant colleges and universities of the United States.

Work has started again on one of the properties of the Champion Mining Co., of Nevada City. The company owns a number of claims, some of which have been very productive, but failure to find good ore for a time discouraged some of the stockholders.

The number of drift mines above Folsom, Sacramento county, is on the increase, and a lot of land hitherto considered worthless has come into the market. The success of a few companies has caused others to invest. They have to sink about 80 ft. to bedrock and breast out 6 to 10 ft. of pay gravel. Some of this ground was worked on the surface 50 years ago.

Spokane. Nov. 6.

(From Our Special Correspondent.)

A mining deal reported this week was the taking up of bonds amounting to $43,000 on the Continental mine, near Port Hill, Kootenai county, Ida., owned by the Idaho-Continental Mining Co., of Duluth. State Senator C. L. Heitman, of Rathdrum, Ida., and Mr. Weins, of Sand Point, Ida., had given bonds on their fractional interest in the group for that amount. The Idaho-Continental Co., which had previously secured the interest of A. Klockmann, of Spokane, took up the outstanding bonds on Friday last. President D. S. Clark, of Eau Claire, Wis.; Vice-President and General Manager W. T. Bailey, of Duluth, and Director Harry Roberts, of Duluth, were here on behalf of the company to close the deal. Surveyors are laying plans for a 200-ton concentrator to be built in the spring. Plans are being made for a 22-mile standard-gauge railway to run from the Kootenai river, at Port Hill, Ida., to the concentrator. The company is working 35 men, and expects to ship some galena ore by wagon this winter to Port Hill, from which point it will be sent to the smelter over a branch of the Great Northern.

The Kendall mine, in Fergus county, Montana, which was taken over by the Finch & Campbell interests in the summer of 1901 from H. A. Kendall, is doing well. They paid him $360,000 for a nine-tenths interest, and he has retained his tenth in stock of the Kendall Mining Co., formed by Finch & Campbell, with a capital of $2,500,000, in $5 shares. The mine is now paying dividends of $25,000 a month, and in the past 11 months has disbursed $205,000 in profits. The monthly dividends for the first five months were 3c. a share; then for four months they were 4c. a share, and for September and October they have been 5c. a share. They will be maintained at the latter figure. There appears to be a large tonnage of low-grade rock, running about $6.50 a ton in gold. Costs are low. R. K. Neill, of Spokane, has been the active representative of the Finch & Campbell interests in developing the mine to its present place.

The International Coal & Coke Co., an auxiliary of the Granby Consolidated Co., has let a contract for building 104 coke ovens at its mines at Coleman, Alberta. Three hundred more ovens are to be built in the spring. The company will supply the Granby smelter at Grand Forks.

The development of the marble industry of Stevens county, north of Spokane, is going steadily ahead. The United States Marble Co. is shipping its green marble in the rough in car-load lots to New York City for interior finish. The Crystal Co. has completed a mill in Spokane, and has sent 15 cars of white and colored marble there to be finished.

Victoria, B. C. Nov. 3.

(From Our Special Correspondent.)

A rather interesting legal point has arisen involving the rights of the locator of a placer claim, who stakes ground previously located for quartz. Last July the Lucky Jack, a rich claim in the Poplar Creek district was staked according to the provisions of the Mineral Act. Two months later, the Shamrock, a placer claim, was located on the same ground. Before granting a record to the latter application, the district Gold Commissioner demanded under section 12 of the placer act that the applicant should put up bonds to the amount of $5,000 to indemnify the Lucky Jack owners in the event of their sustaining damages. This was done, but last week the commissioner found that the carrying on of placer operations would endanger the workings of Lucky Jack, and ordered the stakes of the Shamrock to be moved. The owners intend to appeal..

Rossland.—The Josie mine has resumed operations after a brief suspension due to the Canadian Pacific Railway shipping the ore to the Greenwood smelter. The railway has provided against the difficulty recurring. It is expected that shipments will also shortly start from the No. 1 which has been closed for several weeks. The Le Roi No. 2 concentrator has started operations at full capacity.

Ymir.—Development on a larger scale has recently started at the Wilcox through the No. 2 tunnel, Wilcox, to tap the Fourth of July vein. A small test mill of 2-stamps has been set up in the Gold Cup group. A promising ore-body has been opened on the Tamarac.

Slocan.—At the recent annual meeting last month of the Scottish Colonial Goldfields, Ltd., owning the Idaho & Almo mines at Almo, the chairman stated that a company had been registered with a capital of £130,000 to take over the 26 claims. The mines were unworked for two years, but lately shipments have been resumed at the rate of two carloads a week. Both the Arlington and Howard Fraction mines in the Slocan City division are closed. At the former it is said enough ore has been opened to keep the mill busy some time. Mr. Koch, who has a lease of the upper workings of the Enterprise mine, has leased the property for three years. The mine is the property of Enterprise Mines, Ltd., of London.

Boundary.—The two new furnaces at the Granby Co.'s works will be blown in this week. The International Coal & Coke Co., it is reported, has let a contract for the construction of 104 coke ovens at the Blairmore collieries.

Lardeau.—The new 10-stamp mill at the Eva mine at Camborne is in commission.

East Kootenay.—The Gold Commissioner says much has been done in opening new properties this year, but ore shipments have been limited. A company is now building a big flume at Bull river, and proposes to work the bed for placer gold. On St. Marys river extensive placer operations have been in progress. The North Star mine having completed its contract with the Hall Mines smelter, has decided to suspend shipping for the time being .

London. Nov. 2.

(From Our Special Correspondent.)

The news of the capture and extradition to this country of Anthony Stanley Rowe, the absconding secretary of the Great Fingall Consolidated, is welcomed by everybody who has at heart the welfare and proper management of mining companies. So long a time had elapsed since his disappearance that it was feared the mystery would never be cleared up. So much has been written and spoken in public about Rowe that is misleading, if not erroneous, that it may be advisable here to state the facts. He is usually described as a mining engineer. This is quite wrong, for he was a skilled accountant by training, and by nature had a very able grasp of figures. Some 10 years ago he obtained an appointment, in reply to an ordinary advertisement in the daily papers, as a clerk in the office of Bewick, Moreing & Co., and by dint of his abilities and willingness to undertake hard work, won for himself a very important position on the staff. He acted as secretary and accountant for a number of companies managed by the firm, and generally had a very responsible position. Two or three years ago, Mr. Moreing considered it good policy to take him and a fellow secretary, Mr. Wellsted, into partnership, and this was done at the same time when Mr. Herbert C. Hoover was admitted as a partner. Mr. Moreing's other partners, Messrs. T. B. Bewick and Edward Hooper, left the firm at the time, not agreeing with the new move. At first sight, it seems questionable policy to make accountants members of a firm of mining engineers, but, as Mr. Hoover has pointed out, the firm calls itself "mining engineers and mine managers," and that as far as the second title is concerned the firm's duties, in connection with financial management, are hardly less important than those connected with the engineering side. It was felt that such important duties should not be left to employees, but that they should be in the hands of people who had the greatest possible responsibility, and the only way of giving effect to this principle was to make the head accountants members of the firm. I do not intend to discuss the many objections which may be made to the principle, and the method of carrying it out, because I do not think the private arrangements of a firm are proper subjects for public discussion, and I only mention the details given above to show exactly what Rowe's position was and how he came by it, so that when the case comes before the courts our readers may be able to follow it intelligently.

The Ooregum Gold Mining Co., of India, one of the Kolar group, managed by John Taylor & Sons, is about to issue further capital to provide for necessary developments. In the year 1900, additional capital, to the extent of £79,500 was raised in order to sink a new main shaft, to provide an improved hoisting plant, to erect a new 120-stamp mill and additional cyanide plant. This work has been carried out, and has given excellent results in the way of securing substantial economies and increasing the output. During the current year circumstances have arisen, which have made it highly desirable to spend still further money on capital amount. An important ore shoot has been found between the old inclined main shaft and the Champion Reef boundary, and this cannot be developed on a large scale without a new main shaft being sunk. The ore that is at present being stoped is of lower grade than formerly, and large shipments have to be made, in order to secure economy. It is obvious, therefore, that the stoping from the newly discovered bodies of ore could not be brought to the surface by the present shafts; hence the decision to drive another. In order to provide the necessary capital, 100,000 new shares of normal value 10s. are to be issued at £1 each or 50% premium, so bringing up the nominal capital of the company to £341,000. As I have often pointed out, the system of finance adopted by the companies managed by the firm is the orthodox system, the costs of development, shaft sinking and extension of plant being charged to capital account, while only the costs of mining and treatment, with an allowance for depreciation, are charged to revenue. Thus it is, that during the last three years, when so much money was expended on capital account, as recorded above, the dividends still went on uninterruptedly. The shareholders in these companies unanimously agree to the system of always issuing new shares for extensions, instead of paying for them out of revenue, so criticism of the system from the point of view of these specific cases is misdirected energy.

For a long time past the Transvaal Chamber of

Mines has been represented in London by Messrs. A. Barsdorf & Co. It is now announced that in view of its enlarged sphere of work and the changed condition at the Transvaal, the Chamber has decided to establish its own offices in London, from which all statements will be given out, and where all information can be obtained.

Sydney, N. S. W. Sept. 15.

(*From Our Special Correspondent.*)

Victoria.—In the new Victorian mining bill it is proposed to substitute a minimum expenditure per acre per annum as the basis of title, with a right to take credit in years of stress for excess expenditure during former years, instead of the old labor conditions. This will be a great improvement on the old system, which had been abused by strike leaders and blackmailers.

The Bendigo output for August was 24,542 oz. With the exception of June, 1883, when the total was 24,703, this is the best record for any month since 1876. The total amount declared for the month in dividends was £28,729. The New Moon line of reef appears to be the most productive at present.

Tasmania.—Some of the metals and minerals raised and exported during the quarter ending June 30 were:

Metal.	Amount.	Values.
Gold	13,925,801.00 oz.	£59,154
Silver ore exported	4,299.00 tons.	46,578
Blister copper	1,548.75 tons.	108,338
Coal raised	14,694.00 tons.	12,856
Silver-lead bullion	1,757.05 tons.	61,489
Tin ore exported	45.05 tons.	2,230
Tin (metallic) exported	597.08 tons.	79,089
Copper matte exported	1,815.02 tons.	44,366
Zinc ore exported	100.05 tons.	402
		417,429

A ballot was taken by the Gormanston Amalgamated Miners' Association to decide whether the miners should accept the rate of pay adopted by the management of the Mount Lyell mines. It resulted in 363 voting in favor of a strike and 177 against, a majority of three over the actual majority required. It was decided that the matter be referred to the Victorian executive committee. It is understood that the executive is not in favor of a strike.

Perth, W. A. Sept. 28.

(*From Our Special Correspondent.*)

Kalgoorli.—The Great Boulder's main shaft is sinking towards the 1,900-ft. level. The new hoisting plant ordered for continuing to 3,000 ft. is expected to arrive shortly. The mine is looking well at all points. Work at the 1,050-ft. level of the Associated Northern, where a crosscut is after the ore body found by the diamond drill some months ago, is closely watched as the future of this mine largely depends on the result, since the depletion of the other rich ore. Mr. Wm. Griffith is still at the mine. Fifty more head of stamps, bringing the milling plant up to 150 head, are to be erected as soon as possible at the Golden Horseshoe. The ore reserves at all points are being steadily increased and the monthly yield will easily be brought up to 20,000 oz., though average returns may be somewhat reduced. At the Lake View Consols developments continue good. Owing to the unsatisfactory working of the treatment plans, the management has, however, decided to expend a large sum for a new mill, a Corliss engine to drive the battery and an electric plant for the filter presses. It is estimated the additions, etc., will pay for themselves within a year. The Kalgurli is looking well and good ore is coming from the deepest workings, 1,050 ft., worth 26 dwt. per ton. On the 1,000-ft. level ore worth 19 dwts. per ton is 12 ft. thick. At the Great Boulder South the main shaft is nearly down 900 ft. The Oroya-Brownhill north block shows average assay of over 6 oz. per ton.

Coolgardie.—The water supply dam is overflowing, with 4,600,000,000 gal. of water impounded. The water is being distributed to the mines and is replacing the salt mine water, so that the Government is forced to carry out a drainage scheme to prevent the several hundred thousand gallons pumped daily from flooding the Boulder township.

Menzies.—The Queensland Menzies mine continues its good yields; the output for six weeks to September 24 was 567 tons crushed and 440 tons cyanided, for a return of 1,018 oz. gold. The Lady Sheriton has a special report on the mine by T. Hewitson, of Kalgoorli, and proposes to start extensive development work to test deeper levels.

Auckland, N. Z. Oct. 1.

(*From Our Special Correspondent.*)

Petroleum Exploration.—Boring for oil is still proceeding at Kotuku (Westland), but so far without success, though indications are favorable.

Phosphate Rock Mines.—A considerable amount of phosphate rock of excellent quality is being mined in the Clarendon and Milburn districts, Otago. The greater part is exported, but a portion is utilized locally for superphosphates.

Puponga Coal Co.—This new concern is developing a coal-field near Collingwood, Nelson. Seventy-one men are employed, including the construction to deep water of a pier some 2,400 ft. long.

State Coal Mines.—At Seddonville the various works are being pushed ahead. The main tunnel lately tapped the coal seam. At Point Elizabeth, near Greymouth, good progress is being made with Nos. 2 and 3 tunnels. The tramways and other surface works are well in hand. A 16-ft. seam, previously encountered in a bore-hole, has been struck in No. 1 tunnel. The coal is of fine quality.

Golden Blocks Co.—The annual report of this company, of Taitapu, Nelson, states that during the year 2,402 tons of stone were crushed for a return of 2,121 oz. (approximate value, £7,700). Two 6d. dividends, each amounting to £2,105, were paid.

Hauraki Gold-Field.—During its last four-weekly period the Waiki Co. treated 18,127 tons of ore for a return of bullion valued at £50,136 ($250,680), equal to £2 15s. 4d. ($13.38) per ton. Good progress is made with the erection of the new pumping engine at No. 5 shaft.

GENERAL MINING NEWS.

ARIZONA.

COCHISE COUNTY.

Calumet & Cochise Development Co.—This company started work March, 1903, and has a 2½ compartment shaft down about 670 ft. The property, consisting of 14 claims, is in the Warren district, and has on it a boiler, an 8 by 10 hoist, a Sullivan air compressor and receiver, one 50 h. p. and two 100 h. p. boilers. Scott Turner is in charge. A payment of $25,000 has been made, it is said, leaving $125,000 to be met by February, 1905.

Tombstone Consolidated Mines Co.—The station at the 700-ft. level of this company's mine, near Tombstone, is complete, excepting the sump. The pumps are expected to be working by December 1. A car of ore is shipped daily. The company has sold 10,000 tons of ore on the dump of the Lucky Cross to the El Paso Smelting Company.

MOHAVE COUNTY.

Minnesota.—This mine at Chloride is to be worked again after an extended suspension. A new concentrating plant may be put in operation.

Samoan.—At 600 ft. in this mine on Sherum's peak, near Kingman, rich ore is reported containing native silver and some gold.

Vanderbilt.—An option, it is reported, has been taken on this group at Cerbat by the Premier Consolidated Gold Mines Co., a new concern with a capital stock of $1,000,000. John Boyle, of St. Louis, is president.

YAVAPAI COUNTY.

Equator.—A 300-ton smelter is reported, being built at this mine, 6 miles from Jerome, by W. A. Clark, of Montana.

Sloan.—This property is being operated by the Yaeger Canyon Copper Co., and a shaft is down about 830 ft. Three 80 h. p. boilers, a 14 h. p. hoist and a 10-drill air compressor are on the ground. J. B. Tomlinson is superintendent.

CALIFORNIA.

CALAVERAS COUNTY.

Forty-nine.—This mine, at Douglas Flat, has only water enough to keep the pumps running. Preparations are made to run by steam.

Gold Hill.—This mine, near Mokelumne hill, has been bonded by C. A. Werle and J. W. Hatfield for two years, and work commenced.

Right Bower.—A Boston company has become interested in this claim, at Indian creek.

EL DORADO COUNTY.

Big Chunk.—At this quartz mine, near Kelsey, a new shaft is being sunk by the leasers, Corcoran Bros. and Hartwig Bros.

Lady Emma.—The 5-stamp mill at this mine, near Kelsey, is being moved to a more convenient site, and work is going on. Benjamin Peters is superintendent.

Leavitt Consolidated.—At this mine, near Kelsey, machine drills are driving the tunnel, and a mill is to be built.

Slug Gulch.—This mine, near Fairplay, has been sold by N. B. Hall. It has not been worked for some years.

HUMBOLDT COUNTY.

Original Pioneer.—The owners of this mine, near Orleans, have 10 men at work and a new quartz mill is on the road.

Pholphy Hill.—Siefert & Lubbs, owning this prospect on Red Cap creek, are building houses and will soon start up an arastra.

INYO COUNTY.

Ballarat.—Several outfits are starting up in this camp. At Tuba cañon J. P. Flint has a force of men at work, and will soon be running his 12-stamp mill. The Cecil R. Co. keeps its 8-stamp mill running. At the property formerly belonging to the Ballarat Mining Co. a new mill is going up. At the Mineral Hill mine the cross-cut to the tramway is about finished, and the mill will soon start. At Millspaugh they are rebuilding the mill destroyed by fire.

KERN COUNTY.

Angelus.—For this mine, at Fremont's Peak, drilling machinery has been shipped and drilling for water will soon commence.

Barbarossa.—Mr. Parlow, of Placerville, bought a half interest in this mine, near Amalie, and a gang of men are at work.

Echo.—This company intends adding a roller mill to its 10-stamp crushing capacity.

Exposed Treasure.—Manager DeKalb intends adding 30 stamps to the 20 at this mine, near Mohave.

Gold Peak.—This company, near Amalie, employs 30 men, and is shipping from 10 to 15 tons of ore daily to the Selby Smelting Co.

Pinmore.—This mill, at Johannesburg, owned by the Croesus Mining Co. and leased to Earnestness & Nelson, was burned last week.

MADERA COUNTY.

Gambetta.—The machinery of the Caribaldi mine, at Coulterville, has been bought for this mine, at Grub gulch, giving a total of 50 stamps. About 50 men will be employed under John E. Porter, superintendent.

MARIPOSA COUNTY.

Armstrong.—This copper mine near Indian gulch, owned by R. M. Hotaling, of San Francisco, and W. Roy, of Merced, is to be again worked. A new hoist is to be installed.

Copper Hill.—This mine, near Indian gulch, owned by W. M. Darling, is under development.

NEVADA COUNTY.

Buckeye.—F. J. Lingeman, of Detroit, one of the large stockholders in this property, has been examining the mine, and it is expected that more extended development will take place. T. B. Gray is superintendent.

Cassidy.—Good ore is reported in the cross-cut on this property, at Grass Valley, and an upraise on the course of the vein has been started.

Central Consolidated Mining Co.—C. A. Bailey, president of this company, at Grass Valley, is planning for a new 10-stamp mill.

El Oro.—Work is being rapidly done at this mine, at Maybert, where an aerial tramway is being constructed and the mill overhauled. J. L. Bryson is superintendent.

Gold Bank.—This is a new mine, near Maybert, now owned by Theo. Kohler and Aug. Fisher. Arrangements are being made for a mill.

Huron Mining Co.—A contract has been made with this mine at Omega for electric power from Alta. Arrangements have been made for working this and the Red Cross mine jointly. The 2,500-ft. tramway from the Examiner shaft to the Red Cross mill is under way, and Examiner ore will then be crushed at this mill. The Snyder tunnel is also to be pushed ahead. W. H. Bray is superintendent.

J. Underwood.—This gravel mine, at Omega, is to be started up at once under Superintendent W. Wilson.

PLACER COUNTY.

Vail.—The Frame brothers are working this placer, at Rocklin, and have put in a new machine for saving the gold.

RIVERSIDE COUNTY.

Bowler Free Gold Mining Co.—This company owns several claims in the Chuckawalla mountains, about 23 miles east of Salton. Fred. Bowler, of Los Angeles, is one of the principal owners. A test shipment netted $500 on 35 tons of ore. A tunnel is to be run to tap the ledge at 900 ft.

Kunzite.—A mine of this gem material has been found in the Cahuilla mountain and sold to eastern men for $10,000. Two men patrol the mountain day and night to keep off trespassers.

SACRAMENTO COUNTY.

Prosperity.—A judgment has been entered against this company, near Folsom, for $2,626 for supplies and materials furnished. This is one of the drift mines near Blue Ravine, and has never been brought to a productive stage.

SAN BERNARDINO COUNTY.

Giant Ledge Gold & Copper Co.—A survey is being made for an aerial tramway from the mine of this company, at Manvel, to a point called 29-mile Post, 29 miles from Blake.

SAN DIEGO COUNTY.

Encinitas.—J. A. Wauchope, in charge of the installation of the plant at this copper mine, expects the work will be done and a trial run made in a few weeks.

Oro Blanco.—This company, at Banner, will soon drive its main tunnel about 400 ft. to the Bell mine.

Ranchita.—Cave Couts, owner of this mine, at Banner, has set men at work putting timbers in the shaft.

Stonewall.—At this mine, Cuyamaca, not far from Julian, Col. Lucas has started the mill running on the old dumps. He expects to begin pumping out the old mine shortly, which was at one time a large producer of gold.

SANTA CLARA COUNTY.

Thirty acres of quicksilver land, owned by J. J. Miller, near Evergreen, six miles southeast of San Jose, have been contracted for by H. R. Bradford and others. This land adjoins the Percy ranch, of which 366 acres have been acquired by the same interests.

SHASTA COUNTY.

Connors.—This mine, on Clear creek, is the scene of some excitement, owing to the strike recently made there.

Delta Consolidated Gold Mining Co.—This company has acquired 30 claims in the Dog creek district, near Delta, and extensive development work is to commence. The latest purchases are the Pioneer and Black Oak claims. There are two milling plants on the property, which are to be enlarged.

Keystone.—The new company which has purchased this mine, at Old Diggins, will begin active work at once. W. W. Old is manager.

SIERRA COUNTY.

George Abby.—In this mine, in Lady's cañon, a 4-ft. ledge of good ore has been struck.

Mountain.—This mine, at Sierra City, which has been idle for seven years past, has resumed operations. Everything is being put in order, including the 40-stamp mill. The mine is under bond to L. H. Carver.

Telegraph Drift Mining Co.—This property, near Downieville, is owned by Chicago and New York men, who have recently found phenomenally rich ore in it.

SISKIYOU COUNTY.

Helena Mining Co.—This company, at Callahans, James McKeen superintendent, and A. A. Kidsey, Easton, Pa., president, has shut down for the season and will not start up until next spring.

Medina Gold Mining Co.—This company has bonded the Eastlick mine, at Oro Fino, and developing it under G. W. Addison, of Tacoma, Wash. A double compartment shaft is being sunk and a Hendy mill of 25 tons daily capacity ordered. The company has bonded other property in the same district.

Van Brunt.—This property, formerly the Ah Ock, near Happy camp, is to be worked on a more extensive scale under D. J. Jackson, who is procuring more machinery for it.

TRINITY COUNTY.

Bullychoop Mining Co.—Suit has been brought against this company by J. C. Matod for $2,530, alleged to be due on wood and logging contracts.

TULARE COUNTY.

Eclipse.—C. B. Rogers, who is developing this mine at White river, has purchased new boilers and hoisting machinery.

TUOLUMNE COUNTY.

T. A. Piper and F. B. Moore, of Santa Clara, have bonded for three years the Morning Star, Comet, North Star, Last Chance and Blue Gravel claims, near Tuttletown.

Dutch.—This mine, at Quartz, is running steadily with 20-stamps, using steam as power and oil as fuel.

Golden Thread.—This mine, near Algerine, has been sold by W. F. Craft to James W. McGinn.

Harvard.—This mine, at Jamestown, has closed down indefinitely.

Hardtack.—A half interest in this mine has been bought by Andrew White, of Vallejo for $10,000.

COLORADO.

BOULDER COUNTY.

Anchor.—This mine on Bald mountain, northwest of Caribou, has been shipping ore all summer. The ore is a copper-lead sulphide carrying gold and silver. The vein is 5 to 6 ft. wide, with a pay streak 18 in. wide. The company recently shipped 9 tons, which netted $1,030. Charles R. Wolff, of Boulder, is manager.

Fourth of July.—The tunnel in this property is in about 1,230 ft., and 20 men are employed.

Ingram.—Heavy shipments are being made from the ore body recently opened in this property in the Saline district near Boulder. The ore is 4 to 12 in. wide. Henry Meyer is manager.

CLEAR CREEK COUNTY.

Alpine.—A new boiler will be in place at this mine soon, giving the company two large boilers for the mill. All tables are in place, and in a test recently the mill handled 11 tons an hour. The capacity is 150 tons a day.

Blue Bird.—E. S. Johnson is operating this property on Bull hill, and is to install a Crane washer. In a drift off the 1,400 ft. level several feet of ore, containing from 3 to 5 oz. gold was struck.

Central.—The blind lead struck recently in the tunnel of this company is 5 ft. wide. On each wall is a 10-in. streak, and the vein matter between will pay to handle.

Joe Reynolds.—About 27 men are employed at this mine on Silver creek. The upraise which is being put in to connect the tunnel level with the upper working, shows 3 ft. of ore.

Last Chance.—Hanish & Co., working on this claim, are reported to have a fair streak of ore, which mills over 300 oz. in silver and 7 oz. in gold per ton.

Lovilla.—Work has been temporarily suspended on this tunnel on East Red Elephant mountain, on account of water. There are about 55 claims, and the tunnel is expected to cut the veins 1,000 to 2,000 ft. from the surface.

Lucania.—This tunnel on Fall river, being driven by Colorado Springs people, is making 5 ft. a day. A vein 12 ft. wide has been cut within the bounds of the group owned by the company and for the next 2,000 ft. many of the lodes of Bellevue mountain will be crossed. The company has installed a plant of machinery in Russell gulch and will sink a shaft to connect with the tunnel 3,000 ft. farther in.

Specie Payment.—A contract for the construction of the new power plant for this tunnel has been let. A large compressor and engine will be installed. A tunnel has been started from Virginia cañon to cut 700 ft. below the deeper workings of the property. The distance to shaft is about 3,000 ft., and the company, it is said, has set aside $75,000 to drive this tunnel and open up the mine. The property is on Bellevue mountain.

CUSTER COUNTY.

Bassick.—The mill at this mine is reported to be saving about 84% of the values, and the force of men is being increased by Superintendent Anderson. The output is about 225 tons a day.

Silver Bar.—Rich horn silver is reported on this property by O. W. Murphy.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

October Shipments.—During the past month the shipments of smelting and crude ores, mill tailings and concentrates from the Black Hawk depot were 250 cars, or 5,000 tons. This made an increase of 24 cars, or 480 tons, over the preceding month, which will no doubt be continued for the closing months of the year, as an extra effort is always made to get out all the ores possible during November and December.

Boston-Cleveland Mining & Milling Co.—The shaft on the Arizona, in Elkhorn gulch, has been sunk nearly 500 ft. and good ore encountered, with 3 ft. of ore in the shaft for the last 75 ft., showing an average of $26 per ton for the concentrating ores and $50 for the smelting ores. Boston and Cleveland parties are interested in the property.

Decatur Gold Mining, Milling & Tunnel Co.—This is a new company. The interested parties are residents of Decatur, Ill., and have taken a lease and bond on the Ella D. and Pioneer groups of 14 claims, a tunnel and tunnel site and placer claim situated in Independent district. R. Duncan, Boulder, Colo., will be in charge of operations.

Notaway Mining Co.—A meeting of this company has been called for November 23 in Denver, when steps will be taken to rebuild the shaft building and plant of machinery destroyed by fire October 25. J. F. Perkins, Central City, Colo., is manager for Chicago operators.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

A shortage of cars to haul ore is causing the mine managers of the camp much annoyance as well as heavy loss in production. Such properties as the Coronado, Midas, Caribou and other iron propositions could produce 800 tons more daily were the cars at hand. The impending coal strike is doubtless largely responsible for this condition of affairs, as the railroads are using all their cars to haul coal for themselves. In spite of the car shortage, the production for the month of October was 75,500 tons, including zinc and manganese.

Best Friend.—Lessees will continue operations all winter, and the new tunnel is making good headway.

Bug Gold Mining Co.—Operations have been resumed on this property, in Lincoln gulch. There are great masses of low-grade milling ore which can be mined and treated with a small profit, and the company expects to erect a mill in the spring.

Corinne.—This property is being worked by two tunnels, showing a vein from which assays show a high gold value.

Coronado.—The opening up of the ore bodies of iron in the 600-ft. workings place these people in a position to ship 250 tons daily, but only a small production is being made, owing to lack of freight cars.

Diamond Gold Mines Co.—The drift continues on the ore which has been followed over 250 ft. Shipments of 100 tons daily are being made, and much new work is under way.

Fairview.—Judge Hume, at 150 ft., has encountered in his new shaft a large body of manganese, which is being shipped to the Pueblo steel works at the rate of 35 tons daily. The price paid is $3 a ton on 25% manganese.

Grafton.—Immense bodies of low-grade iron have been opened up, but the small price for this material has forced a suspension.

McRea.—Lessees are working at the 265-ft. level, and have a good iron body, from which they are shipping 25 tons daily of iron that runs 50% excess and 5 oz. silver.

Ohio & Colorado Smelting & Refining Co.—According to Timothy Goodwin, the general manager, there is no truth in the report that the American Smelting & Refining Co. is to buy the Salida plant of the Ohio company and the Republic plant here and the New Monarch group of mines. Mr. Goodwin stated that his company was preparing to enlarge its plant at Salida, as well as to rebuild and install matte and lead furnaces in the Republic plant at Leadville.

OURAY COUNTY.

American-Nettie.—The tramway on this property has been reconstructed under T. F. Neely, superintendent. The mill, electric light plant and tram are in operation again. The usual force of miners is at work.

SAN MIGUEL COUNTY.

(*From Our Special Correspondent.*)

The labor problem is still vexatious and matters are now so bad that an early adjudication of the trouble is not expected. It is very probable that the mines will remain closed all winter. The union is receiving large sums of money with which to carry on the strike and board and lodge the men.

For some time past the Tomboy Gold Mines Co. has been increasing its force of miners, and it was evident that preparations were being made to start the mill. The manager, John Herron, so it is reported, was employing only the men that he thought would not answer to any summons of the union. Recently, however, the secretary of the miners' union ordered all the men to cease employment and come down the hill. In the neighborhood of 80 men obeyed the summons, and the property is tied up. To make matters worse the Federal Labor Union, to which all the cooks and waiters in the district are affiliated, called out all the boarding house employees, and it is impossible for men to stay at the mine, there being no one to prepare their food. The strike before was confined only to the millmen, and the miners were not ordered out, but it has now resolved itself into a general strike. At present there are only 50 stamps dropping in the entire county—the only mill running being the Silver Bell, the management of which granted the demands of the union, when an 8-hour day for millmen was asked.

Carbonero.—The owners of this group, usually considered the richest in the county, recently purchased the North Star, and have begun development work. The North Star is so situated that great depths can be easily had on the veins of both claims, and the ore is of much the same character as the Carbonero. Fifteen men are employed on the two properties at present, but the force will be increased.

Carribeau Montezuma.—This property had been working steadily since purchased by the Yellow Mountain Mines Co., last spring, until quite recently, when it closed temporarily, owing to the bad air in the levels. Eight men are driving a raise to the surface, and when this has been made a large force will start work.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

The strike situation is much the same as last week; there were probably a few more men at work in the mines and a greater tonnage of ore sent out. From the general appearances, the district is the same as before the strike, though there are not so many men working. The official organ of the Union still asserts that there are only a very few men at work on the so-called unfair mines, and that the strikers are bound to win. Even the most radical union men have practically ceased to believe these reports. About the only sign of life among the Western Federation people is that the labor candidate for county assessor was elected this week by a small lead over the Republican

candidate. This was due principally to the fact that the vote of the conservative people was split between the Democratic and Republican candidates. Two banks in the district failed the past week, due to the pernicious effects of the strike.

Miners' Strike.—There is little change in the situation. A few more men are at work and some more ore is being sent out. No new men have come into the district in a body for the past few weeks, though it is rumored that another lot are coming from the Coeur d'Alene country before long. With one or two exceptions all the large mines that were working before the strike are at work again, though not all with full forces. It does not seem necessary at present to get any more men from outside, as quite a number of the union men are breaking away from the Federation.

Last Dollar.—This mine on Bull hill was running at the time of the strike, but shut down. Since that time it has been undergoing considerable overhauling and is ready to start.

Lois Mill.—This mill, situated on Copper mountain, near the Fluorine mine, is now almost ready to commence treating ore. The process will be cyanide, and the owners expect to treat the low-grade oxidized ores from the Fluorine mine, on which they have a lease. The mill is equipped with a set of crushing rolls and four 85-ton ore tanks. Several years ago the Fluorine shipped something over $100,000 worth of ore, and it is understood that there is abundance of low-grade ore left on the property. Developments are being watched with interest.

Stratton's Independence, Ltd.—This property is being examined by several engineers employed by the Stratton estate in preparation for the suit that has been filed against the estate by the Venture Corporation of London, in which that company alleges that the Independence mine was salted by W. S. Stratton before it was sold. It is the general opinion in the district that the suit will not amount to much.

Strong.—This mine is shipping about 120 tons of ore per day from several different levels. The property is operated by the Strong Gold Mining Co., a close corporation, of which Mr. Wm. Lennox, of Colorado Springs, is general manager. The mine is situated in the town of Victor, and was one of the first mines to be shut down on account of the strike.

IDAHO.

IDAHO COUNTY.

Concord Mining Co.—A shaft house is being put up on this property. The shaft is double compartment, 5 by 10 ft. in the clear. The sinking machinery consists of a 45 h. p. Fraser & Chalmers engine, 8 by 10 Lidgerwood hoist and No. 2 Knowles sinking pump. The holdings comprise 13 claims lying in two groups about 2½ miles south of the Hump. W. Q. Brown is manager, and it is said a stamp mill, concentrating and cyaniding plant will be put in next spring.

Jumbo.—Twenty more stamps have been ordered for December delivery for this mine at Hump. About 3,000 ft. of work has been done in the mine. Tunnel No. 1 is in 150 ft., with a depth on the vein of 130 ft. No. 2 is in 500 ft., with a depth of 250 ft. and tunnel No. 3, the main working bore, is in 850 ft., with a depth of 515 ft. Fourteen stamps are now dropping. The mill is also equipped with a Comet adjustable No. B crusher and 6 Wilfley tables, and a cyanide plant will be added. Twenty-mesh screens are in use. The water comes from the hills above by a pipe-line of 2,500 ft. giving a fall of 680 ft. Two 36-in. Pelton wheels run the 12 by 12 compressor. The 14 stamps are 850 lb. each, 8-in. rapid drop, and Fraser & Chalmers make. An electric plant for furnishing power and light will be added. The cyanide plant will probably be of 100-ton daily capacity. Frank Brown is manager.

SHOSHONE COUNTY.

Ella and Missing Link.—The suit involving the sale of these claims which are now owned by the Federal Mining & Smelting Co. has been decided in favor of Charles Sweeny, representing the defendant companies.

Mammoth.—A deed has been filed by Richard Wilson, Walter McKay, James Leonard, William R. Leonard and A. L. Scofield to George Turner, conveying an undivided three-eighths' interest in all the mining claims constituting this group, with water rights and concentrators, for a consideration of $1,500,000. Charles Sweeny was designated as Turner's attorney, and a deed of transfer from him to the Federal Mining & Smelting Co. was filed. The Federal company has taken over the stock in the Standard Mining Co., which carries five-eighths in the Mammoth mine. The deed conveys the interests in the Mammoth not owned by the Standard.

New Jersey Mining Co.—Another change has been made in the mill of this company near Wardner, and a table has been added. This is the second change since operations commenced. An electrical cyanide amalgamating process was installed, but was not found practical. The second experiment was made with two sets of plates.

Stanley Mining Co.—This property is being opened by an adit tunnel now in about 400 ft. W. W. Merk, of Spokane, is general manager.

Teddy.—This group near Wardner, it is reported is opening up a vein of silver-lead concentrating ore within 20 ft. of the surface. It has been cut in several places.

ILLINOIS.

(From Our Special Correspondent.)

The Illinois Division of the National Brotherhood of Coal Hoisting Engineers held a convention at Springfield on November 3 to consider the offer of the mine operators of an advance of $10 per month to all engineers. They decided not to accept this offer, and on November 4 delivered their ultimatum, demanding $15, to be granted by midnight, November 7. A meeting of the executive board of the Illinois Coal Operators' Association was held in Chicago November 6, which resulted in a request by the operators to submit the matter to a board of five arbitrators, two chosen by each side, and these four to choose a fifth. The decision is to be effective from November 1, and must be reached within seven days. In the meantime the engineers are to remain at work. The engineers agreed to this proposition.

SANGAMON COUNTY.

(From Our Special Correspondent.)

Springfield & Chicago Coal Co.—This company is sinking a shaft northeast of Springfield, and has reached coal. It is now driving the main entries.

Springfield Coal Mining Co.—This company expects to resume work at its No. 4 mine this week. The temporary tipple erected will be used until next summer, when a more permanent structure, with shaker screens, etc., will be built.

VERMILION COUNTY.

(From Our Special Correspondent.)

Brookside Coal Co.—The entire top works of this company's mine, near Danville, burned to the ground recently. The territory is nearly exhausted, and it is doubtful whether the company will rebuild or not.

LOUISIANA.

CALCASIEU PARISH.

(From Our Special Correspondent.)

Jennings Oil Field.—Field work in this district has been practically suspended and very little will be done until the price of oil goes up. Crude is now selling at 35c. at the wells and the tendency is upward. The Jennings & Northern Railroad, which will run directly to the oil fields, will be completed about December 31, greatly reducing operating expenses.

Drilling on the Albert Johnson well, west of Jennings, has been stopped after going down 1,800 ft.; no oil was found. Following is a summary of the field: Producing wells, 46; completed, but not producing, 9; abandoned, 10; total, 65.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Arcadian.—The dismantling of this mine has been completed. Nearly all the equipment was sold to the Cerro de Pasco Mining Co., of Callao, Peru, South America. In the consignment were 3 Nordberg hoists, 4 Burt boilers, 1 Nordberg compressor, 16 air drills, 2 steam whims, 10 tons drill steel, 5,000 ft. 10-in. steel pipe, two 18 by 24-in. rock crushers, 2 steam pumps, the tin shop, machine shop and boiler shop equipment.

Atlantic.—This mine produced 327 tons of mineral in October.

Baltic.—The October production was 720 tons of mineral.

Centennial.—Development work continues on the Kearsarge amygdaloid lode. President H. F. Fay, of Boston, has inspected the property.

Champion.—The product in October was 734 tons of mineral. A Monadnock Chilean mill, made by the Trent Engineering & Machinery Co. has been installed for sliming the tailings from the rough jigs.

Franklin.—The October production was 392 tons of mineral. All the jigs for the fourth head are installed at the mill, and the other washing machinery is completed.

Isle Royale Consolidated.—The daily rock shipments to the stamp mill average 450 tons. Two heads are in commission and the mine is operating 35 drills, which are equally distributed between No. 1 and 2 shafts.

Osceola Consolidated.—Exploratory work at the Tamarack Junior branch continues. One drill is sinking a winze from the bottom level of No. 2 shaft. The bottom of the winze is 3,700 ft. from surface. Only 15 men are employed, and the last machinery and tools have been removed to the North and South Kearsarge branches.

Quincy.—The production in October was 1,010 tons of mineral. President William R. Todd, of New York, has completed an examination of the mine.

Winona.—The output in October was 49 tons of mineral. Rock shipments to the Atlantic mill average 200 tons a day. Ten power drills are in commission. In October the rock averaged 20 lb. of mineral to the ton stamped.

Wolverine.—This mine produced 509 tons of mineral in October.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Adventure Consolidated.—William Skewes has resigned as head mining captain and left for South Africa. Superintendent Thomas Dennis will assume the duties. Operations are confined to No. 3 shaft, where sinking is in progress.

Mass Consolidated.—This mine was visited last week by Charles A. Lamb, of Chicago, president of the company. Shafts A and B are sinking below the 13th level. Drifting west from B shaft is under way on all levels from the ninth to the thirteenth. Shaft C on the Butlerlode is sinking at a depth of 450 ft. Thirty-three drills are in commission, 13 in development work.

IRON—GOGEBIC RANGE.

Meteor.—The Castile Mining Co., owner of this mine at Wakefield is sinking an exploring shaft on section 10. This property has never been explored before.

Pike.—It is the intention of the company operating this mine at Wakefield, to sink the new shaft on the east line of the property deeper. The new shaft went into commission last spring.

IRON—MARQUETTE RANGE.

Richmond.—This open-pit mine employing about section 10. This property has never been explored before.

MINNESOTA.

(From Our Special Correspondent.)

Minnesota ore shipments for October were 1,836,000 tons, or 53,000 tons under October, 1902. To November 1 shipments for the year have exceeded last year by 210,000 tons, and now reach 13,855,000 tons. The Duluth, Missabe & Northern will move about 400,000 tons more, the Duluth & Iron Range 200,000 tons, and the Great Northern 270,000, making the total movement from the State for the year 14,730,000 gross tons, or 700,000 tons under 1902, when the State shipped 15,427,103 gross tons. This is a remarkably good record, all hindrances considered.

Vessels of the United States Steel fleet are being laid up at Duluth, some at the shipyard of the Superior Shipbuilding Co., that are in need of winter overhaul, and others at the docks of the Duluth, Missabe & Northern road. All of the 41 barges will be laid by and about half the 72 steamships as fast as they arrive at Duluth. The others will run into November a week or two.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

A State lease in section 14, T. 57, R. 22, has been taken by the Eddy Bros., of Bay City, former owners of the Penobscot mine, and they will have two drills there in a short time. The Eddys have been exploring on their own lands, a short distance north of this property, for some time.

Columbia Mining Co.—This company's Longyear mine, in section 5, T. 57, R. 20, is closed, with 85,000 tons shipped, and still has a stock pile of 25,000 tons on hand. Croxton, section 13, T. 58, R. 20, has shipped 101,800 tons. Cass, a new mine in section 2, T. 58, R. 16, has shipped 60,000 tons, and is closed.

Daniels-Spellman.—This property, covering lot 4, section 5, and lots 1 and 12, section 6, T. 58, R. 15, is now under lease to Messrs. Moore, Coates, *et al.*, of Virginia. The option was originally to the Century Commercial Co., of Duluth, on a 20c. basis and a 50,000 tons minimum. The fee owners have reduced their minimum to 25,000 tons for each of three years, and have received $15,000 in advanced royalties, while the Century Co. gets 5c. additional royalty as the ore is mined. The present lessees expect to turn over their lease to some operating company for a bonus, but have done nothing so far. There are some 800,000 tons of excellent hard ore in the property.

Larue Iron Mining Co.—This company's new Larue mine shipped 35,000 tons and will produce about 10,000 tons more before the season closes. This mine did not have rail facilities until August. It is an open pit property in section 29, T. 57, R. 22.

Mahoning Ore and Steel Co.—This company has ceased shipments at its large mine in section 2, T. 57, R. 21, with a total of 1,010,000 tons for the year. The

shovels formerly in ore are now stripping on the north and west sides of the pit, and will work as late as possible. The company will do its own stripping.

Pickands, Mather & Co.—This company has closed its Sparta mine, at Eveleth, and will mine no more there this year. Its Elba will produce about 200,000 tons this year, a material reduction from the season before. Its Troy, a new mine, not entered until during last fall, is to make a production this season of about 30,000 tons, practically all of which has been in the way of development. The main shaft is down 140 ft. and drifting of 800 linear feet has been done in ore. The overburden was 90 ft. deep where the shaft was sunk, with a heavy quicksand, which bothered the operators considerably. Stockpile ground has been levelled off and a trestle is built.

Republic Iron & Steel Co.—All the Mesabi range mines of this company are to reduce forces for the winter. Its Kinney mine, being a steam shovel property, is to close completely in a few days. At this mine, where the Wallace Contracting Co. began preparing for stripping the overburden less than two years ago, it is soon to complete the stripping contract for 2,000,000 yards. Two large shovels have been stripping continuously and a very large area has been cleaned. The overburden is from 40 to 45 ft. thick.

Standard Mining Co.—This company has turned over to D. M. Philbin and associates its option for a lease on the Arcturus mine, in T. 56, R. 24, West Mesabi, and Mr. Philbin, who is manager of the ore end of the Great Northern road, will try to handle it.

Stevenson Iron Co.—This mine has closed for the season with shipments of 1,000,000 tons. Stripping will be continued late into the fall.

MONTANA.

JEFFERSON COUNTY.

McCabe.—This syndicate which has large holdings in the Wickes-Corbin district, 20 miles from Helena, recently purchased a number of claims adjoining its former holdings and now has about 200 claims. The latest purchase was from Frank Erickson of Wickes, who sold two claims one-half mile from Wickes for $10,000 in cash.

MADISON COUNTY.

Kearsarge.—Fire in this gold mine, six miles from Virginia City, on November 6 killed 9 men, among them Superintendent R. B. Turner, of Butte. All the dead miners were from Butte and were single men. The Kearsarge is operated by the Alder Mining Co. At about 5 o'clock in the morning fire was discovered issuing from the tunnel house on tunnel No. 1, and the timbers in the tunnel were ablaze. How the fire originated is not known. At the first alarm all the employes, some 170 in all, hastened to aid in subduing the flames. Superintendent Turner entered the tunnel through the fire and smoke to give warning to the entombed miners and aid in their escape. He returned and tried to enter the mine by the air shaft, but fell from the ladder and was killed.

Revenue Mining Co.—A 100-ton cyanide plant is to be erected at the mines of this company at Norris and the water piped to it from the well 2½ miles away. Roger C. Knox is manager.

San Domingo Mining Co.—This company of New York has bonded the Bonanza mine near Rochester for $50,000.

MISSOULA COUNTY.

Tarbox Mining Co.—At this mine at Saltese a strike of 12 in. galena is reported in the 400-ft. level. D. Daxon is manager.

NEW JERSEY.

MORRIS COUNTY.

Hurd.—For the first time in 70 years, this iron mine at Wharton is shut down.

WARREN COUNTY.

Thatcher.—This old iron ore mine, near Stewartsville, which has been idle a number of years, has been leased by Wilson H. Woodring, of Northampton county, Pa. New machinery will be installed.

NEW MEXICO.

GRANT COUNTY.

Wild Cat.—The litigation over this mine and mill at Santa Rita has been settled and work will be resumed soon. The Clifton Copper Co. assumes full control of the mine and mill and will increase the capacity of the concentrator from 65 tons to 150 tons daily. Arrangements have been made for the settlement of all claims outstanding.

Shamrock Smelting Co.—This company near Silver City has received a new 40-ton furnace.

TAOS COUNTY.

Tampa.—At this mine in the Bromide district, 12 miles west of Tres Piedras, a rich vein was struck, it is reported, 13 ft. thick. The property belongs to the Tusas Peak Mining Co., of Manistee, Mich., and is worked under the management of Frank Bolton. The company owns a mill site just below the mine on the Tusas and will in all probability put in a concentrator. Eight feet of the vein is said to be good concentrating ore and the balance will be shipped without treatment.

NEVADA.

NYE COUNTY.

(From Our Special Correspondent.)

Belle of Tonopah Mining Co.—This company, owning one full claim and a fraction 1,500 ft. north of the Montana Tonopah, has encountered a series of stringers at 400 ft. assaying $12 per ton gold on the average. At 300 ft. water was struck, but below this the shaft is dry.

Midway Mining Co.—This company, owning three claims, and having a capital of $750,000, has absorbed the Silver Top Mining Co., which owned one claim and a fraction adjoining on the north. A new company, it is said, will be organized, with a capital of $1,000,000, of which $100,000 will be issued to the shareholders of the Silver Top Mining Co. The latter company had sunk 120 ft., but water and lack of capital caused operations to be suspended. The Midway shaft is down 545 ft., with considerable crosscutting and drifting, which has exposed bodies of milling ore assaying from $30 to $90 per ton, which will be treated at the mill now being installed, and which is expected to start crushing by the end of November.

OHIO.

SUMMIT COUNTY.

Massillon Coal Co.—This company has opened a tract of 100 acres, including the village of Manchester, in which it has a 6-ft. vein of coal at a depth of 170 ft.

Girard Coal Co.—This company has opened a new field at Cottage Grove on an 80-acre tract.

OREGON.

BAKER COUNTY.

Almo.—All machinery has been received for the 10-stamp mill. The water-power plant of 140 h. p., consisting of 3 wheels, is in position. One wheel is for the stamp batteries, one for the rock breaker and concentrating tables, and one for the electric light plant.

Blue Bird.—Grading near Sumpter, for this 100-ton concentrator with Sturtevant rolls, is finished and work will now center on the buildings.

JACKSON COUNTY.

Condor Water & Power Co.—The big dam at Tolo built by this company across Rogue river, is completed. Power will be supplied to many mines. The company is preparing to install the turbines and other machinery.

JOSEPHINE COUNTY.

Sexton.—This property on Jumpoff Joe creek, formerly the Wimer placer, has been leased under bond to Richardson & Bumgardner.

PENNSYLVANIA.

ANTHRACITE COAL.

Scranton men are developing a coal tract near Hunters' station. Jacob Fisher is superintendent. A new shaft is down 100 ft. and a 7-ft. vein of coal was struck recently.

Crystal Run.—This colliery at Frackville is being developed by John L. Williams, of Shenandoah. Pumping out an old slope which was abandoned 20 years ago was begun recently.

Eagle Hill.—The new shaft at this colliery will shortly be started. The Philadelphia & Reading Coal & Iron Co. has awarded the contract to the Dolan brothers.

Lehigh Coal & Navigation Co.—Flooding the No. 6 shaft of this company to put out the fire is completed. The water will be left standing for several weeks, and the colliery should resume business operations in about six weeks. Nearly all the men working in No. 6 have been given employment at other workings.

BITUMINOUS COAL.

The option on 8,000 acres of coal land at $100 per acre in Lone Pine, Somerset county, has lapsed, and those taking the options have forfeited $10,000, owing to their failure to effect a sale.

The mines along the Buffalo valley are running on short time. The Allegheny mines have shut down altogether. At Garret, Somerset county, many of the miners are moving on account of the scarcity of work.

Beech Bottom Coal Co.—This company is opening 2,200 acres between Beech Bottom and Short creek, in Brooke county, and has let the contract for its tipples to W. Scaife & Sons, of Pittsburg; the contracts for screens, scales, etc., to Phillips Mine Supply Co., and for its steel rails to the Carnegie Steel Company.

Quemahoning Valley Coal Co.—This company is developing its 2,000-acre tract of coal land at Boswell, and expects to have mines in operation in November. Among those interested are: A. H. John, of Johnstown; W. H. Ruppel, F. W. Biesecke, George R. Scull and Abner McKinley, of Somerset.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Clara Belle Mining Co.—Another strike of free-gold ore has been made in the bottom of the shaft. The 2-stamp Tremaine mill will soon be started. Frank Hebert, of Custer, is president and manager.

Custer Mountain Mining Co.—Articles of incorporation have been filed. The directors are John Oak, Dennis Henault, Samuel Virtue and William Nevin, Jr., of Custer. The principal development is a 60-ft. shaft, showing a 3-ft. vein of pyrite, carrying gold.

Extreme Mining Co.—A 10-stamp mill is nearly completed and the company has on hand a large quantity of free-milling ore, on which the mill will be started as soon as concentrating tables are added. J. N, Wright, of Custer, is manager. The concentrates will be shipped to a smelter.

UTAH.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Ore Shipments.—For the week ending Nov. 6, 138 car loads were shipped as follows: Centennial-Eureka, 36 cars; Grand Central, 24; Yankee Consolidated, 5; May Day, 1; Uncle Sam Consolidated, 1; Bullion-Beck, 2; Dragon Iron, 30; Swansea, 5; Sunbeam, 1; Ajax, 2; Carisa, 6; Lower Mammoth, 7; Black Jack, 7.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

Ore and Bullion Settlements.—Salt Lake banks report settlements to the amount of $432,000 during the week ending November 6, as follows: Crude ores and concentrates, $214,300; base bullion, $205,500; gold bars, $12,200.

Bingham Consolidated.—The copper bullion shipments week ending November 5 were 3 cars, 181,698 lb.

United States Smelter.—Shipments of copper bullion during the week ending November 5 were 3 cars, 182,626 lb.

Utah Consolidated Smelter.—Shipments of copper bullion week ending November 5, aggregated 5 cars, 300,921 lb.

WASHINGTON.

FERRY COUNTY—REPUBLIC.

(From Our Special Correspondent.)

Republic Ore Shipments.—For the week ending October 28 the Quilp mine shipped 400 and the Morning Glory 30 tons of ore to the Tacoma smelter; the Mountain Lion shipped 810, the Knob Hill 62, and the Zala M. 98 tons to the Hall Mines smelter.

Belcher.—The vein was cut recently in No. 3 tunnel, 365 ft. from the portal. The tunnel gives 165 ft. additional depth on the vein. A gasoline engine and blower are in transit and heavy machinery is soon to be installed.

Lucille Dreyfus.—The mine has been closed down. No reason is given. A large quantity of ore was shipped to the smelters, but while shipments were made about all the ore in sight was taken.

Maud S.—The tunnel is in 190 ft., and a contract has been let to drive 50 ft. further.

CHELAN COUNTY.

(From an Occasional Correspondent.)

Banner.—On this group in the Meadow creek valley about 1 mile from Lake Chelan, a company is installing a compressor plant to be operated by water-power. Dr. Jacobs is the manager. The ore is copper and gold.

Chelan Railway & Navigation Co.—This company is building an electric railway to connect Lake Chelan with the Columbia river, between Chelan and Chelan Falls. R. D. Johnson is manager.

Chelan Transportation & Smelting Co.—This company is building a 15-mile line of railroad to connect the Holden mine with Lake Chelan. Grading is completed and almost all the ties are cut and on the right of way. The company expects to begin laying rails as soon as weather permits next spring. Heretofore the expense of shipping ore has been prohibitive to practically all claims in this district.

Holden.—This group of three claims is the most developed property about Chelan. It is on Copper mountain in the Railroad creek valley 10 miles from Lake Chelan. The company has 3 tunnels; the longest is in 500 ft. The vein carries copper and gold ore. While classed as low grade, the ore is reported rich enough to pay for smelting without concentration.

The company expects to put in a 10-drill compressor and an aerial tramway next spring, and has closed a smelting contract which calls for 500,000 tons of ore to be delivered at a rate of not less than 200 tons per day.

WISCONSIN.

GRANT COUNTY.

Hazel Green Mining Co.—The new mill has been completed and is in operation. An electrical apparatus for furnishing power to the various pumps and hoisting towers will soon be completed.

Murphy-Warring.—An 80-h. p. boiler and other machinery have arrived for this mine, near Hazel Green. The prospects are encouraging and machinery is being installed.

IRON—MENOMINEE RANGE.

Commonwealth Iron Co.—This company has arranged to do exploratory work on its section 16 property near Commonwealth. A churn drill has been shipped in.

LAFAYETTE COUNTY.

Hoskin Mining Co.—The plant of this company, at Benton, was destroyed by fire recently, the loss being $25,000, with insurance of $7,000.

WYOMING.

CARBON COUNTY.

Iron ore is reported on a tract of 500 acres 30 miles north of Rawlings. The tract is owned by Martin Pattison, of Superior, Wis., who is sinking a shaft.

FOREIGN MINING NEWS.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—The shipments for the week ending October 24 were: Granby mines to Granby smelter, 9,440 tons; Snowshoe mine to Sunset smelter, 2,070 tons; Mother Lode mine to Greenwood smelter, 2,888 tons; Sunset mine to Sunset smelter, 80 tons; Emma mine to Granby and Nelson smelters, 396 tons; Oro Denoro to Sunset smelter, 954 tons; Winnipeg to Sunset smelter, 270 tons; Athelstan to Sunset smelter, 270 tons. Total for the week, 16,016 tons. For the week ending October 31, shipments were: Granby mine to Granby smelter, 9,029 tons; Snowshoe to Montreal & Boston smelter, 2,640 tons Mother Lode to Greenwood smelter, 2,336 tons Sunset to Montreal & Boston smelter, 120 tons; Emma to Greenwood, Granby, Trail and Nelson smelters, 1,056 tons; Oro Denoro to Montreal & Boston smelter, 726 tons; Winnipeg to Montreal & Boston smelter, 100 tons; Athlestan to Montreal & Boston smelter, 120 tons; total for week, 16,127 tons; total for year to date, 530,128 tons.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—Shipments for the week ending October 24 were: Le Roi, 5,640; Centre Star, 1,440; War Eagle, 1,140; Le Roi No. 2, 270; Jumbo, 100; I. X. L. (milled), 140; Kootenay, 30. Total for the week, 876 tons. For the week ending October 31, shipments were: Le Roi, 5,070; Centre Star, 1,440; War Eagle, 1,110; Le Roi No. 2, 220; Jumbo, 300; Kootenay, 180; I. X. L. (milled), 140; total for week, 8,460; year to date, 330,574.

MEXICO.

LOWER CALIFORNIA.

At the Thames the first deep bore-hole on the Kuranui-Caledonian ground has in a fortnight attained a depth of about 500 ft. The ground passed through has been decomposed andesite, with a few quartz stringers. The bore is being put down at an angle of 82°, and is expected to intersect several well-known reefs at depths of from 600 to 1,200 ft.

Henry Johnson has sold to Chicago men his placer mines, 80 miles southeast of Ensenada, for a stated price of $100,000. An 18-mile ditch has been completed to the ground.

Statements published in the newspapers of the richness of mining ground in the San Antonio district are not reliable. The district is 35 miles southeast of La Paz on the west coast. There is no water in that region, as was stated in a previous letter, and dry washers are not successful in handling any quantity of earth.

OAXACA.

Escuadra.—A 30-in. vein of rich ore is reported in this mine in the Taviche district. The mine was sold a year ago for $1,000,000 to Cortan & Hamilton, but is said to be really owned by the Guggenheim Exploration Co.

La Natividad Mining Co.—This company, it is reported, has contracted for a complete electric plant of 350 h. p., to cost about $70,000. The proposed improvements suggested by the managing engineer are estimated to cost fully $200,000.

MINING STOCKS.

New York, Nov. 11.

To say the stock market is feverish, seems too mild a diagnosis of the relapse suffered this week from heavy liquidation and new low record prices for the steel trust securities. There are some people who believe that the bottom has not yet been touched, and state as evidence the weakness in the iron trade and the peculiar tactics of the syndicate which has the power to convert Steel 7% preferred stock into 5% sinking fund bonds. In six days 833,324 preferred shares were sold at a fall of 7¾ points, the lowest price being $49¾, on Tuesday, which is $2.25 less than the previous low record. In the same period 219,282 common shares changed hands at a loss of 2⅜ points to $10, which is the low-water mark. Contrary to expectation, the rumored settlement of the copper controversy, and subsequent denial, had little effect on Amalgamated, which fluctuated 3⅜ points during the week, selling at $35⅜@$38¾. Anaconda was also comparatively inactive, selling at $15.50@$16.50.

The coppers on curb have experienced a quiet time, though Greene Consolidated showed increased sales at lower prices. From $16.50 this stock dropped to $14.75, later recovering only a fraction. United common, of Montana, was steady at $16.37½@$17.00 on limited trading. Tennessee moved at $30.25@$28.50, while White Knob, of Idaho, softened to $9.

Standard Consolidated, of California, which appears only at long intervals, sold down from $2.40 to $2.25 on few transactions. Quicksilver preferred came forward at $5.50.

The Comstocks are again lining up on the assessment roll, but market prices do not indicate that there is investment buying at this season. Consolidated California sold at $1.05, Ophir at $1.40, Caledonia at $1.10, Best & Belcher at $1.40, and Union Consolidated at 48c. Silver Hill, the dividend stock in Nevada, brought 53@63c.

Colorado stocks are almost silent, only the old favorites being called at few changes in price. Portland, of Cripple Creek, changed hands at $1.15, and Elkton at 40@45c.

Boston. Nov. 10.

(*From Our Special Correspondent.*)

The copper share market continues to be a drifting one, with here and there a spasmodic effort at activity. Prices as a rule are not far away from those of a week back, yet withal there is a firm undertone, and with any pronounced buying activity higher prices would certainly ensue. It is felt that a settlement between the Amalgamated and Heinze interests would be the basis for a generous sized bull market.

Old Dominion mining affairs are being stirred up, and even though Mr. Fitzgerald does nothing else, he will make known facts in connection with the United Globe property, which Old Dominion holders are in ignorance of. Director Towle, Mr. Fitzgerald's partner in the brokerage business, has resigned from the Old Dominion directory. Deposits of Old Dominion stock, under the recent plan, exceed 100,000 shares or more than enough to carry the deal through. The time for depositing expires November 16. The trading now on the exchange is in temporary bank receipts. During the week the stock has sold at from $12 to $10, closing at $10.50.

Boston Consolidated has been active and buoyant, although not a regularly tested stock. It has advanced from $6 to $6.62½, with sales at the latter price and many unfilled orders. The railroad to this property is expected to be completed by November 15, when shipments of 200 tons of ore per day will be made to the Bingham smelter. Copper Range continues to be the most active stock in this market, with a range of $3.87½ during the week, and the close $1.87½ below a week ago at $45.37½. Amalgamated has fluctuated from $39.25 to $35.50 and the close is a fraction above a week ago at $38.87½. The strength of this stock in the face of an otherwise weak market must bear some significance. Calumet & Hecla has lost $15 to $435, and Tamarack fell $10 to 85, but the latter rallied to $97.50. Utah went off $1.75 to $26.25, on profit taking, but closes at $27. Wolverine fell $2, to $64, but recovered the loss. Mohawk fell $1.75 to $36, but recovered the better part of $1. Osceola slid off $3 to $55, with $2 recovery. Quincy is off $5 to $85. Franklin is in better demand at from $8.25 to $7.75. Parrot has settled $1.25 to $18, but is very quiet.

Dominion Coal dropped $5.75 to $71.75, but recovered to $74.37½. Dominion Iron took a dip of $2, to $6.50, on rather limited trading, recovering all but a fraction of the decline. United States holds steady at $18.25@$17.50. Shannon is off to $8.25; Consolidated Mercur is off to 90c., and Daly-West holds around $37.50.

Colorado Springs. Nov. 6.

(*From Our Special Correspondent.*)

The market during the past week has been a disappointment, as far as prices were concerned, but the volume of business transacted has been very satisfactory. The heaviness in prices is probably due to a number of selling orders. The prospect list has been popular, and prices have held steady or advanced.

C., K. & N. sold during the entire week at 21c., considerable stock changing hands. Acacia weakened from 6 to 5½c. bid. Elkton opened the week at 44, sold off to 42½ and back to 43c. El Paso followed suit, opened at 54, weakened to 52½ and then sold up to 53c. The stock was in good demand. Gold Dollar Consolidated closed weak, selling at 3½c. Isabella opened at 10½ bid, but gradually sagged and was offered at 10, with 9⅝c. bid. Sales were made at the former figure. Moon Anchor was one of the few stocks to advance, the bid a week ago being 9, while to-day none could be had at 10c. Portland continued to sell at $1.10. Work was weak at 4½c. Among the prospects, Blue Bell was traded in to some extent at 6, Mary Nevin at 2⅞@3, Gold Sovereign at 3 and Banner at 1¾c. Old Gold could not sustain the advance of the past few weeks, declining from 10¼ to 9⅝c. bid.

Salt Lake City. Nov. 7.

(*From Our Special Correspondent.*)

A heated municipal election held last Tuesday, coupled with the uncertain conditions in the money centers of the East, caused a lull in the mining stock market this week. The total business transacted on the Salt Lake Stock and Mining Exchange amounted to the transfer of 83,730 shares, the same selling for $69,778.

The Grand Central has resumed the payment of dividends again, and will distribute $25,000, or 10c. a share, November 14. A block of 1,000 shares sold at $4.37½. Silver King posted the usual monthly dividend of $100,000, and the Daly-West followed suit by posting $117,000. The Century Co. also sent out $1,500.

Less than 500 shares of Daly-West sold, closing slightly stronger. A fair demand was found for Daly-Judge, 2,655 shares going at $11@$11.75, ending somewhat weaker. Some mechanical defects in the Consolidated Mercur mill have had the effect of frightening a few holders of the stock; the result is a decline, but the management gives assurance that the trouble is being rapidly overcome.

A new discovery of ore on the 300-level of the New York Bonanza encouraged the buying of that stock early in the week; it advanced to 24c., followed by a drop to 19c. Star Consolidated found some demand, but at lower prices.

San Francisco. Nov. 7.

(*From Our Special Correspondent.*)

There was very little change in the Comstock shares during the week. The Gold Hill stocks were in a little the better demand, and this helped to steady prices somewhat. Most of the business, however, was done on a small scale, 'chippers' being more in evidence than anybody else. Some quotations noted are: Consolidated California & Virginia, $1.15; Mexican, 94c.; Sierra Nevada, 36c.; Gould & Curry, 23c.

On the San Francisco & Tonopah Exchange business was only fair. There was some demand for the low-priced stocks, Esperanza selling very largely. Montana Tonopah brought 90c.; Tonopah & Salt Lake, 17c.; Hannapah, 10c.; Esperanza, 2c.

On the California Exchange considerable business was done in oil stocks, but at a somewhat lower range of prices. Buying was chiefly of the low-priced shares, although considerable interest was shown in Home. Sterling sold at $2.75; Home, 95c.@$1; Occidental, 18c.; Lion, 4c. At this price, Lion seemed to be in demand.

COAL TRADE REVIEW.

New York, Nov. 11.

ANTHRACITE.

The anthracite coal market continues to be quiet, and is, in fact, still entirely on a weather basis. The change in the temperature a few days ago had some influence upon retail trade, but the cold spell was of such short duration, that it was hardly felt in wholesale business. In New York, Philadelphia, Boston and other large cities on the coast, the retail yards are pretty well stocked, so that dealers have no difficulty in making prompt deliveries, when an extra demand arises, and there are no hurried calls upon the railroads. The approach of December, however, gives hopes of a better demand.

In the West the anthracite markets are generally quiet. The close of lake navigation is approaching, and the supplies already sent to the Northwest have been so large, that there will be no especial rush at Buffalo or the other Lake Erie ports. At Duluth and the other northwestern ports, the congestion on the docks still continues and vessels complain of delay in unloading. Most of the iron ore boats are going out of commission for the winter, and the supply of tonnage for coal up the lakes is falling off, al-

though it is still sufficient for the demand. In Chicago and the territory supplied from that point, trade is reported quiet; local dealers are generally well supplied, and more coal is coming in, so that the docks are full at Chicago and Milwaukee, and not much all-rail coal will have to be carried this winter.

Prices in New York harbor continue unchanged for domestic sizes. For the steam sizes, there has been some falling off, owing to the very low quotations made on bituminous coal.

The production for November will probably show some falling off owing to the stoppage of work at several collieries for various causes. The October output was 3,925,642 tons, which is considerably more than was mined a year ago; for the 10 months ending October 31, the total production was 51,011,936 tons, which is very much more than double the quantity reported for the corresponding period of last year.

BITUMINOUS.

The Atlantic seaboard soft coal trade remains quiet. Consumers have been leaning toward the poorer grades, as the margin of prices between these and the better qualities has been too high. Consequently, sellers of the better grades have reduced their prices, and we hear now that they quote slightly under $3 per ton, f. o. b. Philadelphia. This, however, has not encouraged demand, as had been expected, nor does it seem likely that an improvement of consequence will come with colder weather. The present situation of the trade is commented on in our editorial columns.

Trade in the Far East is quiet. The small balances on contracts to shoal-water ports are being cleaned up. To the deep-water ports, business is slack, and orders are scarce. Along Long Island Sound little is being done, and it appears difficult to induce consumers to take coal. New York harbor business is sympathetically quiet, and enough coal arrives at tidewater to keep prices down.

All-rail trade is steady, and is in better condition. Transportation from mines to tide is unchanged, coal taking about a week or two to run through. The car-supply is up to the demand. In the coastwise market vessels are in poor supply. Coastwise freight rates from Philadelphia are: To Boston, Salem, Portland and Portsmouth, 75@80c.; Long Island Sound, 65c.; Lynn, 85@90c.; Newburyport, 85@95c.; Saco, $1.10 and towages; Gardiner, $1 and towages; Bangor, $1, Bath, 80c. The same rates are quoted from the farther lower ports. From New York harbor to Bangor, and other Maine ports, 70c.; Boston, Portland and Salem, 60@65c.

Birmingham. Nov. 9.

(From Our Special Correspondent.)

Chief State Mine Inspector Gray asserts that coal production is as steady as the railroad transportation permits, the shortage in cars being felt in mining circles as well as elsewhere. He says that the production for this season is about as strong as it was last year at this time. Up to date there have been 46 fatal accidents in Alabama mines, against 50 for the entire year 1902.

The Mississippi river trade is commanding a large quantity of coal being mined in the western part of Walker county, and coal from the western part of Jefferson county is also being purchased to some extent to help fill river orders.

The Warner mines, employing more than 200 men in all, were idle the better part of the past week. The miners and mine workers claimed that the Republic Iron & Steel Co. should have paid off October 31, in accordance with the contract, based on the decision of the board of arbitration a few months since. The company did not construe the contract as compelling it to pay off until November 7, and the mine workers lost a week. The semi-monthly pay day is now in full vogue among the Alabama coal mines. So far the company stores, which were complained of, have not felt a great loss in trade since the men have been getting their stipends semi-monthly.

The regular monthly investigation of the iron sales books of the Tennessee Coal, Iron & Railroad Co. and the Sloss-Sheffield Steel & Iron Co. by committees of the mine-workers in the employ of these companies took place during the past week, the object being to ascertain the mining wage for the present month. The mine-workers in the employ of the Sloss-Sheffield Co. received a reduction of 2.5c. per ton. Their miners had been receiving 55c. per ton. The Tennessee Co. made no change in its wage scale, but last month the Tennessee Co. paid 2.5c. less per ton for mining than did the Sloss-Sheffield Co. Both companies this month pay 52½c. per ton.

Chicago. Nov. 9.

(From Our Special Correspondent.)

Trade in both anthracite and bituminous coal has improved materially in the last week since the coming of colder weather. In the first part of the week there was something of dulness owing to the warmth of a protracted Indian summer. The business in anthracite, due to stocking up for the winter by consumers and retailers, has apparently reached its limit, and the trade must depend on the variations of the weather for large or small orders. Lake business continues heavy, but all rail trade is very small, owing to the scarcity of box cars. The price of anthracite is unchanged—$6.50 for egg, stove and chestnut, and $6.25 for grate, with a little speculative coal at prices slightly lower.

Illinois and Indiana cheap grades are in better demand than more expensive bituminous, but even the screenings trade can hardly be called booming. Supplies from Indiana are getting better transportation facilities, but conditions are far from ideal yet. Lump is selling at $2.25@$3, as last week; run-of-mine has net prices of $1.80@$2.20; screenings hold at $1.20@$1.75. Hocking is the steadiest in demand and keeps well up to circular prices, $3.80 for steam lump, $3.90 for domestic lump, $3.65 for run-of-mine, and $2.90 for nut, pea and slack. Youghiogheny and Pittsburg are in light demand, Youghiogheny selling at $3.25@$3.50, and Pittsburg at $3.35@$3.55. Smokeless continues comparatively unpopular with consumers, and there are large discounts, 40 to 60c. from the list prices of $4.35 for lump and egg, and $3.90 for run-of-mine. Smithing coal is in light demand at $4@$4.25. Cannel is selling fairly well at $5@$5.50.

Cleveland. Nov. 10.

(From Our Special Correspondent.)

The rumor which has been afloat of a possible decision to close the bituminous mines for a month this winter is beginning to take very definite form, one of the operators having made the statement here a short time ago that such is the intention soon. The production of steam coal has been very heavy, and the consumption not as large as had been expected, preventing the customary season advance in the prices, upon which some of the operators had come to count in making up the average of their profits for the year. The market being deprived of that influence, looked very dull. To stimulate the trade and prevent a serious over-production it is said that the mines are to be closed for 30 days. Run-of-mine Pittsburg coal is being sold in Cleveland at $2.15; slack is bringing 50c. at the mine, and Massillon coal is sold at $3.50 to the dealer in Cleveland.

The coke situation is very much easier. The car supply has been abundant and the movement of it from the ovens to the consumer has been very heavy. While the market conditions would naturally be weak under these circumstances, prices hold their own. In only one way is there any weakness seen, the lower priced cokes getting the greater portion of the business. The prices, however, have held at $3 for 72-hour foundry coke, with high sulphur cokes bringing $2.75 at the oven.

The lake movement is about over for this year and the market is very tame. The shipments are as heavy as the movement from the mines to the lakes will permit, and as the condition of the upper lake docks will afford. The rates are unchanged.

Pittsburg. Nov. 11.

(From Our Special Correspondent.)

Coal.—It has just developed that heavy reductions have been made in prices and that large contracts have been taken for delivery next year at from 30 to 55c. a ton below the circular prices of April 1. Following is a list of the prices, the first figure being the circular price and the second the rate at which new business has been taken: 1¼-in. coal, $2, $1.70; ¾-in. coal, $1.90, $1.60; run-of-mine, $1.80, $1.50; nut, $1.50, $1; nut and slack, $1.40, 85c.; slack, $1.30, 75c. Coal operators were surprised during the week upon the receipt of an inquiry from an eastern syndicate for 10,000,000 tons of coal for delivery next year. It is said the coal is intended for export trade and that the concern conducting the negotiations is the Republic Coal Co., with general offices at No. 66 Broadway, New York. It is known that the coal companies in the Pittsburg district are preparing to extend their business and greatly increase their capacity. It is given out on reliable authority that the Pittsburg & Buffalo Co. has already closed contracts for 1904 delivery for fully 90% of its present capacity. The Pittsburg & Buffalo Co. is the largest operating concern outside of the two large combines and, in addition to operating seven large mines, owns over 50,000 acres of undeveloped coal lands in the Pittsburg district. The deal between the Pittsburg Coal Co. and the railroads, whereby it will be provided with all the cars required next year, is said to have been practically closed. While prices for 1904 will be much lower than have prevailed this year it is believed the production will be almost doubled.

Connellsville Coke.—Prices have been going down and a movement has been started to maintain rates and to curtail production. A meeting of all interests including the H. C. Frick Coke Co. was held yesterday afternoon for this purpose, and 90% of the operating ovens in Western Pennsylvania were represented. After discussing the situation a committee was appointed to devise means for the even distribution of the curtailment and to arrange a plan for maintaining prices. The special committee will get down to work at once. Foundry coke has declined and is now selling at a lower figure than the minimum of $2.75 agreed upon by the pool of independent operators. The H. C. Frick Coke Co. has again entered the foundry coke trade, but in order to get business, it is said it will be forced to shade a price of $2.60, at which sales are being made. Furnace coke is still quoted at $1.90, but as low as $1.75 can readily be done. The *Courier* in its last report gives the production for the previous week at about 150,000 tons, a falling off of over 25,000 tons. The shipments for the week aggregated 6,859 cars distributed as follows: To Pittsburg and river tipples, 2,925 cars; to points west of Pittsburg, 2,472 cars; to points east of Connellsville, 1,462 cars.

San Francisco. Nov. 7.

(From Our Special Correspondent.)

The coal market continues quiet, with fair arrivals. A significant fact is the purchase by the Southern Pacific Railroad Co. of stocks in producing oil companies, which is noted in another column. The railroad's consumption of coal is steadily decreasing.

Quotations show no change. Pacific coast coals in large lots to dealers are quoted as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; white ash, $5.25. For Rocky Mountain coals, ex-car, to dealers, prices are $14 for Colorado anthracite; $8.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside. Eastern coal is still nominal at $14 for Pennsylvania anthracite, and $13 for Cumberland, with very light stocks. Foreign coal in cargo lots is quoted at $13 for Welsh anthracite; $8.50 for cannel; $7.50 for Wallsend and Brymbo.

Foreign Coal Trade. Nov. 11.

Export trade continues very quiet. A little more business to the West Indies is reported. In view of present conditions, there is a good deal of talk about developing trade to foreign countries, especially to France and Italy. This has not yet passed beyond the discussion stage.

The coal trade of France, including both imports and exports, for the nine months ending September 30 is reported as follows, in metric tons:

	Imports.	Exports.
Coal	7,258,570	620,700
Coke	976,840	60,420
Briquettes	408,310	51,050

Exports were very small, and chiefly to Belgium and Switzerland. Of the imports, a part came from Belgium and some also from Germany, but the great bulk of the coal was from Great Britain.

According to a report from the French consul at Hong-Kong, the coal imports into that city in 1902 were 123,760 tons more than in 1901. The total imports were 1,040,900 tons, 641,740 tons of which were used in coaling vessels leaving the port. A portion was imported by the British Admiralty for its naval station there. The imports comprised 820,000 tons from Japan, about 40,000 tons from Australia, and 100,000 tons from Hon-Gay, Tonkin. British ships-of-war used exclusively coal from Cardiff. Most of the Tonkin coal is re-exported to Canton to be employed by the silk-weaving factories, it being preferred to the Japanese. No American coal is reported.

Messrs. Hull, Blyth & Co., of London and Cardiff, report, under date of October 31, that the demand for coal for the Far East ceased for the moment, but prices still continue firm. Quotations are: Best Welsh steam coal $3.72@$3.84; seconds, $3.66; thirds, $3.54; dry coals, $3.36; best Monmouthshire, $3.30; seconds, $3.24; best small steam coal, $2.16; seconds, $1.98; other sorts, $1.80.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Mouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½% discount.

The freight market still continues steady. Some rates quoted from Cardiff are: Marseilles, $1.25; Genoa, $1.20; Naples, $1.08; Las Palmas, $1.44; St. Vincent, $1.62; Rio Janeiro, $2.52; Santos, $2.76; Buenos Aires, $2.04.

IRON TRADE REVIEW.

New York, Nov. 11.

The iron markets continue in an extremely uncertain condition. Early in the week it was announced that the Steel Billet Association had resolved to reduce prices, in order to meet the cuts made by outside mills. The new price is $23 per ton at mill for both bessemer and open-hearth billets. This is a reduction of $2 per ton on bessemer and $4 on open-hearth. The action, however, has not started up buying, partly for the reason that consumers' require-

ments had been filled by contracts with outside mills, and partly because the heavy cut excited hope that still further reductions would be made.

The bar market seems to be thoroughly demoralized, and steel bars have sold at 1.30 and 1.40c. at mill, while still further cutting is rumored. Iron bars are temporarily out of the market, as makers have refused to meet the reduction in steel. The representatives of the plate mills and of the structural iron makers have held meetings and have decided to make no reduction in prices. Consumers generally believe that this action cannot be maintained; some assert that it is simply a bluff. Consequently, there has been no business done for nearby delivery, although one or two large contracts on old specifications have been awarded, as noted below.

The blast furnaces in the Pittsburg district are generally reducing production as agreed, and the falling off in the pig iron output may be even greater than was at first expected. The prices of pig iron are again lower. The southern pig iron market is simply a scramble, and all sorts of prices are quoted.

Bridge Commissioner Lindenthal, of New York, on November 10, awarded the contract for the steel superstructure of the new Blackwell's Island bridge over the East River to the Pennsylvania Steel Co., at its bid of $5,132,985. Some litigation is pending, which may affect this award.

German Iron and Steel Trade.—Exports of pig iron from Germany for the nine months ending September 30 were 338,216 tons, against 225,118 tons for the corresponding period in 1902. Exports of iron and steel of all descriptions, outside of pig iron, were 2,332,855 metric tons, against 2,146,907 tons last year. showing an increase of 185,948 tons.

Imports of iron ore into Germany for the nine months ending September 30 were 3,904,531 tons, an increase of 794,063 tons over last year.

Birmingham. Nov. 9.

(From Our Special Correspondent.)

Alabama furnacemen are selling considerable pig iron right now, and the activity is only being held down by the scarcity of railroad cars. No one seems willing to announce what price is being received. The investigation of sales books by committees of miners in the offices of two of the larger companies in the Birmingham district during the past week showed that the average price was under $10.50 and above $9.50 per ton; in other words, the selling price of No. 3 foundry was between those figures. It is heard that $10 is now the limit for No. 2 foundry. Gray forge has been sold under $9.50. Some iron is now being shipped by Alabama furnaces to the foreign markets. There was no denial of the statement that a pool is being formed in the South looking to the shipment of 50,000 tons of pig iron to the foreign markets. except that the shipments will be made by individual companies and on business worked up or in course of being worked up. The Sloss-Sheffield Steel & Iron Co. has already started a good-sized movement to foreign markets, and it is reported that other companies in this district have made arrangements with vessels to leave in the next few weeks to carry iron.

The plan of curtailment of production in this State is still being maintained. Two more furnaces have been blown out—Lady Ensley furnace, of the Sloss-Sheffield Co., at Sheffield, and No. 3 furnace of the Tennessee, at Ensley. Both of these furnaces will be thoroughly repaired while out of commission.

No. 1 foundry is quoted a little above $10. No. 8 foundry is said to be varying between $9.75 and $10. It is not possible to get statements as to iron prices right now, but all offers are being considered.

Fnished iron and steel show but little, if any, improvement. The rolling mills are in steady operation with the plate mills on. The product is being shipped out about as quick as it is manufactured. There is a good stock of different sizes, however, always on hand.

At the steel plant of the Tennessee Coal, Iron & Railroad Co. at Ensley, better conditions prevail again. The steel rail department is on an order for 5,000 tons for the Alabama Great Southern, delivery to be made just as quickly as the product is manufactured. It is stated officially that the company has also an order for 25,000 tons from the Southern Railway. The order from the Louisville & Nashville, mentioned heretofore, is for 30,000 tons of rail instead of 25,000 tons, but no delivery is to be made thereon until 1904. The production of steel at the Ensley plant during the month of October was larger than during any one month since the plant has been erected, 17,045 tons of steel were turned out.

In cast-iron pipe the conditions are most healthy, the different foundries hereabouts working steadily, and shipments are rapid. The city of St. Louis, Mo., is receiving a large consignment of pipe from the Bessemer plant of the United States Cast Iron Pipe Co. The Dimmick Pipe Co., at North Birmingham, is losing no time and is shipping freely.

Foundries and machine shops report trade slow. Some of the larger shops appear to have plenty of work on hand and in prospect, but the general conditions could be better.

Chicago. Nov. 9.

(From Our Special Correspondent.)

To all appearance the depression in the pig iron market will continue until the production of the supply becomes less than the demand from the consumer. Then a reaction will come, with the rising market that every selling agent is looking vainly for at present. When the change will occur, is a subject of speculation among local agents; they agree on only one point—that it will not come in 1903. "Next year" is now the subject of hopes and plans. The difference between northern and southern prices is growing less, and will probably continue to grow less, for northern furnaces have been selling at less than the cost of production for several weeks, if not months.

Southern No. 2 brings $9.50, Birmingham, or $13.35 Chicago, as a minimum, though the prospects are that this price will be shaded at least 25c., as the ruling figure on sales of any importance, within the next week. Southern brings $14.50@$15 on most sales. As heretofore, foundrymen wish quick deliveries; there is no change and no prospect of change in this respect. Sales are comparatively small, not reaching more than 2,000 tons to the largest consumers.

Coke is so plentiful that it is hard to dispose of it; the best 78-hour foundry can be bought for $5.30 and the accumulation of cars on which demurrage is threatened is so great as almost to demoralize the market. As in previous congestions, shipments will probably be restricted so as to clear the surplus out within a week or two.

Cleveland. Nov. 9.

(From Our Special Correspondent.)

Iron Ore.—The shipments of ore down the lakes during October were 3,006,387 tons, a decrease from the same month last year of 304,569 tons. The shipments up to November 1 were 22,383,350 tons, a decrease from those for the same period a year ago of 1,636,686 tons. This movement shows to what extent the lessening of the movement down the lakes has gone thus far this year. It is hardly possible that the figures will exceed 24,000,000 tons for the year. Boats are being laid up now very rapidly; all of the barges having been ordered in and some of the steamers.

Pig Iron.—The buying of foundry pig iron comes mostly now from the South, where the prices have been cut to such a point as to make it an inducement to northern consumers. Some of the off irons of the South has gone to $9.50 per ton at furnace, but the better grades have sold for $9.75@$10.25, Birmingham. This has shut out much of the iron which might have been sold by the northern stacks. Instead of cutting prices they have merely made a slight change in the basis, doing away with the Valley quotations and meeting competition by shipping from the stock nearest the market at a price which will net the producer $14.50. In a few isolated cases this has been cut to $14.25. There is a small call for malleable at $15@$15.50. There is a fair inquiry for all irons for future delivery. The bessemer and basic qualities are about off the market for the time being, some of the stacks getting ready to go out of blast December 1, to further lessen the surplus on the market. The material is not quotable.

Finished Material.—The announcement was made during the past week that the price of steel bars had dropped $6 a ton or from the basis of 1.50c. Pittsburg for bessemer to 1.30c. Pittsburg for the same material, other grades being shaded on that same price, the usual differences prevailing. Contrary to the expectations of the mills, when this reduction was made buying did not follow, but the market became more timid, holding off for further declines,

There has been a perceptible increase in the specifications against contracts, but new contract booking has been light. The substitution of iron for steel has, of course, stopped, and the buying of bar iron has eased off, the market being rather light, but showing no tendency to break further, except on good specifications. Bar iron prices have held at 1.40c. Youngstown, with some shading. It has also been announced that the price of steel billets has been lowered by the association by $4 a ton, or from $27.50, Cleveland, to $23.50, Cleveland. This has brought about a little different buying, but has hardly increased it. The smaller mills, which had been getting the bulk of the business at $26, have had to share with the other mills, but have not continued their policy of getting business at the expense of values by cutting under the association price. Sheet prices have been wavering, with daily expectations that the price would be cut, but without any definite action yet having been taken. The market, however, is weak, with a very uncertain list of prices. The larger mills hold tenaciously to the old list of 3.05 for No. 27 Black sheets out of stock as a basis, although this is being cut under upwards of $3 a ton by the smaller interests. There has been a reduction in the price of hoops, which have declined from 2c., Pittsburg, to 1.75c., Pittsburg. The action of the association in deciding to hold for the old price on plates, structural shapes and rails did not cause much of a flurry, the market having discounted such an action. In this territory it has spoiled the hope of inducing some ship-building, but other interests were not seriously affected. The price holds at 1.60c. Pittsburg.

New York. Nov. 11.

Pig Iron.—Market conditions are still unsettled, and buying is only for immediate wants. Consumers look for still further reductions. Southern furnaces are selling at low prices, but will not contract far ahead on these quotations. We quote: No. IX foundry, $15.75; No. 2X, $15, while No. 2 plain can be had for 50c. less; gray forge, $14. For Southern iron on dock quotations are: No. 1 foundry, $14.25; No. 2, $13.50. Sales of gray forge are reported at $12 and even below.

Bar Iron and Steel.—The market is demoralized by the cutting in the West. Buying is only for immediate use. Common bars have sold as low as 1.40c. There is no demand for refined. Steel bars are selling at about the same as iron.

Plates.—Demand is very light and is for small lots. Sheared plates are quoted as follows: Tank, ¼-in. and heavier, 1.78@1.83c.; flange, 1.95@2.05c.; marine, 2.10@2.15c. The plate pool has refused to reduce prices, but buyers believe that a cut will come.

Steel Rails.—The quotations remain $28 for standard sections, f. o. b. mills; light rails, $33@$36, according to weight.

Structural Material.—There is no improvement in demand. For large lots at tidewater, nominal quotations continue 1.75@2c. for beams, angles, channels and tees. The makers have decided to try and maintain prices. The letting of the Blackwell's Island bridge contract is noted elsewhere.

Philadelphia. Nov. 11.

(From Our Special Correspondent.)

Intense interest is felt in some quarters in the Alabama iron situation. Some purchases have already been made in this market of No. 2 foundry at Birmingham for early winter delivery, and buyers who are investigating the subject will probably place additional orders during this month. The price of $9.50 @$10 at Birmingham with added freight makes that iron very desirable among users of No. 2. Inquiries have been made with reference to securing low terms for next year's delivery but no definite results have been reached owing to an unwillingness on the part of Southern makers to take contracts so far ahead. Very little business has been done in other directions, but there are a good many requirements, which probably will be filled before long, as there is a better feeling gradually manifesting itself in the eastern Pennsylvania markets. There is very little inquiry for forge iron owing to the dullness in bars. Quotations are only nominal this week. No. 1X foundry is held at $16; No. 2X foundry ,$15; No. 2 plain, $14; gray forge, $14; basic, $14@$14.50.

Steel Billets.—The drop in steel billets from $27 to $23 has long been looked for, and a further drop is now predicted, for bessemer and open-hearth steel billets. In consequence of these rumors, only a small amount of business has been done. Some reports assert that the drop will be to $21 before the bottom is reached.

Merchant Bar.—The cut of $6 in soft steel bars has naturally created a great deal of interest in the market. The shading of steel bars by outsiders during the past month satisfied consumers large and small, that a general cut was coming. Consumers in this territory believe that the heavy increase in capacity now under way will still further depress prices during the coming season. The larger consumers are very cautious as to how they buy.

Sheet Iron.—The sheet iron market is in a more unsettled condition this week than it has been for some time and for easily understood reasons. The whole situation is unsettled. Sheet iron is declining in price and until some definite level can be reached it will be impossible to report transactions of any magnitude.

Skelp Iron.—The skelp iron market is exceedingly quiet and no business is being done.

Pipes and Tubes.—A renewal of negotiations set in this week between some eastern consumers and mills in which the recent reduction in raw material is expected to play an important figure in the naming of new quotations. The consumptive requirements for pipes and tubes have declined very little and our larger interests here are quite willing to continue their policy of placing contracts far ahead provided reasonable insurances can be given against declining prices.

Merchant Steel.—Unusual interest is felt in the merhant steel market. Some very large contracts are likely to be placed soon. The course of our eastern trade here will be determined by the course pursued by the big buyers in the West. The general impression here is that from now until the close of the year requirements for the first three or four months of next year will be covered.

Plates.—Those who are well informed do not attach any credit to rumors of a cut in plates before the holidays. The action of the steel-plate pool ought to settle that matter, but there is a feeling in this territory that the position occupied cannot be maintained and that a reduction in steel plate is bound to come.

Structural Material.—Very little new business has been done in this market this week, but we hear of rumors and reports of the probable closing of big orders, in consequence of an undertaking having been arrived at as to the cost of raw material. The undertone of this market is not as strong as it might be.

Steel Rails.—Street rumors are to the effect, notwithstanding all that has been said as to the determination of the railmakers to maintain prices for steel rails, that a reduction will be brought about. It is known here that large buying interests will not place further orders for steel rails at present prices.

Old Rails.—Offers were made this week for two or three lots of old rails at $16, but these were refused.

Scrap.—Very little business is being done in scrap iron owing to the unsettled condition of the iron and steel market. Scrap is being allowed to stay in the hands of its producers until they conclude to accept prices considerably lower.

The Reading Iron Co. will reduce wages November 16 from $4.50 to $4 per ton and other classes of labor from 3 to 10%. A 5% reduction will soon be made by the Phoenix Iron Co. At four or five mills in eastern Pennsylvania a number of workmen have been laid off and at Pencoyd mill in this city, one entire department has been laid off, the intention being to abandon the plant entirely.

Pittsburg. Nov. 10.

(From Our Special Correspondent.)

The most important events of the week in the iron and steel market were the reductions in price of steel billets and steel bars. Both bessemer and open-hearth billets were cut to $23, the former from $27 and the latter from $28. Steel bars were cut $6 a ton or from 1.60 to 1.30c. a pound. An agreement was reached at a meeting of steel interests which began in New York last Wednesday. Another meeting of the billet pool is scheduled for to-morrow to adjust the differentials for sheet and tin bars. The reduced prices decided upon are under the lowest figures named by outside interests and was done to instill confidence in the market and to encourage buying. No change was made in the prices of plates or structural material, and they may not be disturbed. It is reported to-day, however, that a meeting is to be held in New York some time this week and that plates will be cut to 1.40c. and structural material to 1.50c. The rail pool is to meet to-day or to-morrow to consider the situation, but it is understood the official price of $28 will be continued. So far it is estimated that near 1,000,000 tons of rails for delivery next year have been contracted for. This is about one-third of the capacity of the mills. The price of common iron bars has been cut also, and sales have been made during the week at 1.30c. the same price as has been fixed for steel bars. Manufacturers here take a more encouraging view of the situation this week, and declare that the cuts in prices will strengthen the market and that before the first of the year the mills will be again running to their full capacity. B. F. Jones, Jr., chairman of the Jones & Laughlin Steel Co., one of the largest independent steel interests in the country, said to-day that the depression is about over and buyers are beginning to place their orders. The Duquesne plant of the Carnegie Steel Co. was put in partial operation on Sunday night and it likely will be on in full before the end of the week. The Woods Run works of the Pittsburg Forge & Iron Co., which have been idle for some time, were started in full this morning, on orders from the West which, it is said, will require fully six months to fill. The bessemer plant of the Republic Iron & Steel Co. at Youngstown was put in full operation yesterday and the Brown-Bonnell works of the same company, which have been in partial operation, went on in full. At the Valley works the puddle and plate mills resumed yesterday. While the report lacks official confirmation, it is generally believed that the United States Steel Corporation has just closed contracts in England amounting to 100,000 tons for sheet and tin-plate bars. It is reported to have sold tin-plate bars in South Wales at a higher price than was quoted by German steel mills.

The pig iron market shows some signs of improvement, but is not yet in a satisfactory condition. Sales of foundry iron have been larger during the week than for several weeks past. The curtailment of production is greater than the 25% called for in the agreement of the furnace interests of the Central West. A meeting of the restriction committee was held in the office of the Carnegie Steel Company on Friday afternoon and the situation is given in the statement issued by the chairman, J. G. Butler, Jr. It is as follows: "I have received information from the various pig iron producers in the Central West, embracing Pittsburg and vicinity, the Wheeling district, the Mahoning and Shenango valleys, southern Ohio, Columbus and Cleveland, that production in October was 35% less than capacity. On November 1, the statistics and information show a reduction of 49% less than capacity. It is believed this 49% will hold good during November."

The Bessemer Furnace Association, composed of the majority of the merchant interests of the Mahoning and Shenango valleys, has fixed the price of bessemer iron at $15 at furnace and its members are quoting this as the minimum price.

Pig Iron.—Only a few small sales of bessemer pig iron were made during the week, but several thousand tons of foundry iron were contracted for. Bessemer is quoted at $15, valley furnace, but one or two small lots were sold at $14.85. One order for foundry No. 2 called for 2,000 tons for delivery at the end of the year, one half northern and one half southern. The northern is for two lots, one at $14.35 and the other at $14.50, Pittsburg. The price of the southern iron is understood to be $13.85, Pittsburg or $9.50, Birmingham. Foundries are running out of iron and are forced to make purchases and small lots are bringing $14.75@$15, Pittsburg. Gray forge is quiet and the price is a trifle lower than a week ago. One lot of 200 tons sold at $13.85, Pittsburg.

Steel.—The cut of $4 on bessemer and $5 on open-hearth billets is likely to induce business, the price now being uniform at $23. The price of sheet and tin-plate bars will be adjusted to the new billet price some time this week. Steel bars are now quoted at 1.30c. the lowest price for nearly three years. Plates remain at 1.60c. and structural material is unchanged. Prices in these lines, from present indications, are not to be disturbed, but there is no certainty as to what action will be taken at the meeting arranged for this week.

Sheets.—There does not seem to be any recognized price for sheets. The official price of No. 28 black sheets are quoted at 3.85c., but sales are made at a less figure.

Ferro-manganese.—There is no change in the market, domestic 80% still being quoted at $48.

Cartagena, Spain. Oct. 24.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—Since our last report exports from this port have been two cargoes, 5,500 tons manganiferous ores, to Great Britain, and one cargo, 6,400 tons dry ore, to Sydney, Cape Breton. No improvement is noticeable in the local market, and new contracts are scarce. The steady fall in the rate of exchange will have the effect of either reducing exports, or increasing sterling prices, as there is no margin for any reduction in local prices at mines for such ores.

Prices remain nominally at 6s. 9d.@7s. per ton, f. o. b. shipping port, for ordinary 50 per cent ore; 7s. 3d.@7s. 9d. for special low phosphorus, 8s. 9d. for special ore; 9s. 3d. for 58 per cent specular ore. Magnetic ore, 60 per cent iron, is 11s. 6d. for lump and 9s. 6d. for smalls. Manganiferous ores range from 14s. 6d. for 20 per cent manganese and 20 iron, to 9s. 9d. for 12 manganese and 35 iron.

CHEMICALS AND MINERALS.

(See also Prices-Current on page 762.)

New York, Nov. 11.

The second week in November shows a better inquiry for heavy chemicals, and additional contracts for 1904 delivery have been booked at current quotations. There is still some inconvenience to manufacturers by the limited supply of railroad cars to move goods.

According to report, the recently discovered deposit of arsenic in southwestern Virginia is being developed by the United States Arsenic Co., in which Pittsburg people are interested. At present there is only one source of domestic supply of white arsenic—the Puget Sound Reduction Co., at Everett, Wash., which began its manufacture about two years ago. The bulk of the consumption is satisfied by imports from Europe and Canada.

The consumption of foreign chemicals and minerals imported into the United States in the nine months ending September 30 was approximately as follows. Figures are in pounds, unless otherwise stated:

	Imports.	Re-exports.	Consumption.
Asphalt, tons	125,492	1,007	124,485
Cement, lb	741,500,627	6,079,455	735,421,172
Chlorate of potash	308,928	19,105	289,823
Muriate of potash	110,538,447	284,694	110,253,753
Saltpetre	11,484,940	354,921	11,130,000
All other potash	47,363,208	9,027	47,354,181
Caustic soda	2,144,260	810,162	1,334,098
Sal soda	2,682,283	448	2,681,835
Soda ash	17,274,416	26,706	17,247,710
All other, except nitrate	11,693,519	39,438	11,654,081
Graphite, tons	13,233	59	13,174
Salt, lb	247,882,097	7,582,178	240,299,919

Increases are shown this year in all substances, except the heavy chemicals—soda, ash, etc.—graphite and salt, products that are being produced in increasing quantities in the United States.

Cyanide.—Momentarily, business is quiet, but prices continue on the 20c. per lb. basis.

Bleaching Powder.—There is a relaxation in the demand for next year's delivery, for which sellers of prime brands ask $1.25 per 100 lb. for British, $1.20 for German and $1.25 for American at the Atlantic seaboard. Off-test bleach can be had at a substantial discount from these prices. For prompt delivery some effort is shown to induce buying at $1.10@$1.15 for the better grades, but little business is being transacted.

Copper Sulphate.—Generally speaking, the market sustains its recent advance, but trade is limited. At $4.85 per 100 lb., f. o. b. works, there ought to be a good profit to makers. Advices from abroad report a firmer market there, and note further shipments to the United States.

Acids.—Deliveries on contract show an improvement in sulphuric and muriatic acids. Prices are unchanged.

We quote as below per 100 lb., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity.

Muriatic, 18°	$1.50	Oxalic, com'l	$5.00@$5.20
Muriatic, 20°	1.00	Sulphuric, 50°, bulk, ton	13.50@14 50
Muriatic, 22°	1.75	Sulphuric, 60°	1.05
Nitric, 36°	4.37½	bulk, ton	18.00@20.00
Nitric, 38°	4.75	Sulphuric, 66°	1.20
Nitric, 40°	5.00	bulk, ton	21.00@23.00
Nitric, 42°	5.37½		

Brimstone.—Demand is anything but active, and few sales are reported from steamers to arrive. Nearby cargoes are quoted at $23.25 per ton, while shipments, owing to easier ocean freight rates from Sicily, are offered at $22@$22⅜ for best unmixed seconds. Best thirds are 50c. less than seconds.

Imports and re-exports of foreign brimstone in the United States in September and the nine months this year were as below, in long tons:

	September	Nine Months.
Imports	8,075	132,556
Re-exports	71	848
Balance	8,004	131,708

Most of this brimstone was in best unmixed seconds, and came direct from Sicily. Compared with last year the net imports show an increase of 1,411 tons.

Pyrites.—Another cargo of 3,000 tons iron pyrites from Newfoundland has arrived at New York. Apparently, the Canadian miners are gaining customers in this country, as imports are on the increase.

We quote: Domestic pyrites, $5 per ton for lump ore, f. o. b. Atlantic coast mines, and 10c. per unit for fines; sulphur content varies from 42@44%. Spanish pyrites, carrying from 46@52% sulphur, are quoted at 11@12c. per unit for lump, and 10@10½c. for fines, delivered at Atlantic ports.

Imports of pyrites, chiefly from Spain and Newfoundland, into the United States in the nine months ending September 30, with an estimate of their sulphur content, were as follows, in long tons:

	1902.	1903.	Changes.
Imports	335,941	310,554	D. 25,387
Sulphur content	157,892	145,960	D. 11,932

The average invoice value of the pyrites imported this year was $3.74 per ton, as against $3.81 in 1902.

Nitrate of Soda.—The market on spot and for this year's arrivals is strong, owing to delayed sailings from the west coast and a good demand. Futures also continue firm, being influenced by the reported scarcity of nitrate in Chile and prospects for an increased consumption in Europe. Freight rates, however, are easier. Spot nitrate of soda is quoted at $2.10@$2.12½ per 100 lb.; November to December arrivals, $2.10; January, $2.07½; February to April, $2.05; May to June, $2.02½; July to December, 1904, $2.

Reports of the various companies operating in the Chilean nitrate industry during the year ended June 30 last are now being submitted to the stockholders. It is interesting to note that the Santiago Nitrate Co. has declared dividends amounting to 20% for the year, after providing for regular working expenses and the payment of interest and redemption of debentures. Hope in the future is centered in an increased consumption, which will lessen the difficulty of regulating the production to meet the exigencies of new oficinas.

Messrs. Mortimer & Wisner's monthly statement of nitrate of soda, dated New York, Nov. 1, gives the following interesting statistics, in tons:

	1903.	1902.	1901.
Imported into Atlantic ports from West Coast S. A—From Jan. 1, 1903, to date	194,357	149,704	148,224
Stock in store and afloat Nov. 1, 1903, in New York	2,500	1,987	6,900
Philadelphia	3,000	....	1,733
Baltimore	....	6,636	6,133
Savannah	4,500	....	....
To arrive, due Feb. 15, 1904	80,300	65,467	60,000
Visible supply to Feb. 15, 1904	90,300	74,090	74,766
Stock on hand Jan. 1	7,800	10,000	1,793
Deliveries past month	21,677	26,839	13,120
Deliveries since Jan. 1, to date	192,157	151,419	135,252
Total yearly deliveries	....	179,613	175,176
Prices current, Nov. 1	2.10c.	1.87½c.	1.90c.

Deliveries are considerably larger than previous years, and prices are also better.

Sulphate of Ammonia.—The early settlement of the Scotch shale workers' troubles had some influence on the American market for sulphate of ammonia. Shipments are therefore easier at $3.05 per 100 lb. for foreign, and $3 for domestic.

Phosphates.—New orders are seldom large enough to attract attention, and the determination of miners to maintain prices at a remunerative level makes the market conditions rather uninteresting. Preparations are already being made for winter, and miners who find it convenient are beginning to stock their sheds. In Florida hard rock miners, whose properties have opened to water level, are installing dredgers, a system of mining that is of comparative recent date in the phosphate industry. Some interest is shown in the alleged discrimination in freight rates by the railroads to Fernandina and Savannah, the advantage being with the latter port, which, though it is double the distance from the mines, pays the same rates in the aggregate as Fernandina. Attention has been called to this matter by the increasing shipments through Savannah.

Exports of phosphates from the United States in September amounted to 66,514 long tons, making 585,789 tons for the nine months this year, which is 11,325 tons better than 1902. Germany has been the largest buyer. Imports of phosphates from Belgium and other countries in September were 14,088 tons, bringing the total for the nine months up to 111,930 tons, or 36,003 tons more than last year.

The shipments of Florida phosphates by water in September were 47,095 long tons hard rock, 16,805 tons land pebble, and 2,505 tons Peace river pebble, making a total of 66,405 tons. This is the third lowest record this year, and is much less than was reported in September, 1902. In the nine months ending September 30 the shipments were distributed as follows:

	Domestic.	Foreign.	Total.
High-grade rock	1,000	346,632	347,632
Land pebble	118,065	118,911	236,976
Peace river pebble	49,985	....	49,985
Totals	169,050	465,543	634,593

Compared with the corresponding nine months last year, there is a total increase of 37,139 tons, or 7 per cent.

Since exports constitute over 73% of the total shipments, it will be interesting to give the countries which bought the largest quantities of Florida phosphates, namely:

	Hard rock.	Land pebble.	Total.
Belgium	29,993	....	29,993
France	3,200	22,955	26,155
Germany	198,247	12,390	210,637
Holland	47,044	....	47,044
Italy	13,523	30,380	43,903
Sweden	22,183	11,960	34,143
United Kingdom	23,512	28,526	52,038
Other countries	8,930	12,700	21,630
Totals	346,632	118,911	465,543

As shown above, Germany continues to receive the bulk of our exports, and its purchases exceed those of last year. It is noteworthy also that 2,700 tons of land pebble have been exported to Japan this year.

Exports of Tennessee phosphates through Pensacola in September were 12,384 tons, making a total of 87,591 tons in the nine months, chiefly to Italy and France. This shows little change as compared with the exports reported in the corresponding nine months last year.

In foreign phosphate mining sections some large orders have lately been taken at higher prices, particularly for the African grades. On Ocean Island work is active, and it is reported that shipments this year will total about 50,000 tons, which will be doubled in 1904.

Phosphates.	Per ton. f. or b	United Kingdom or European ports. Unit.	Long ton.
*Fla. hard rock (77@80%)	$7.25@$7.50	6¼@7⅝d.	$10.53@11.70
*Fla. land peb. (68@73%)	3.75@ 4.00	5⅛@5¼d.	7.70@ 8.05
†Tenn. (78@80%) export	4.00@ 4.25	6¼@7d.	10.40@11.20
†Tenn. 78% domestic	3.75@ 4.00	.....	.....
†Tenn. 75% domestic	3.50	.....	.....
†Tenn. 73@74% domestic	2.95@ 3.20	.....	.....
†Tenn. 70@72% domestic	2.70@ 2.95	.....	.....
‡So. Car. land rock	....@ 3.25	.....	.....
‡So. Car. riv. rk. (55@63%)	2.75@ 3.00	4⅝ 5⅛d.	5.55@ 6.60
Algerian (63@70%)	.....	5⅛@6¼d.	7.37@ 8.38
Algerian (58@63%)	.....	4⅝@5¼d.	5.55@ 6.90
Gafsa (Tunis)	.....	5¼@6d.	6.30@ 7.20
Christmas Isl. (80 85%)	.....	7⅛@8¼d.	12.38@13.61

*Fernandina, Tampa, Brunswick, Savannah or Port Inglis.
‡Mt. Pleasant. †On vessels, Ashley River.

Liverpool. Oct. 28.

(Special Report of Joseph P. Brunner & Co.)

Two items of interest to report are the fixing up at last of the working arrangement between the English and continental bleaching powder manufacturers, and the excitement in sulphate of copper. The shutting down of the Amalgamated Copper Company's mines in America and consequent smart advance in copper has had the effect of putting up prices of sulphate about 20s. per ton, and a large business is reported to have been done for spring delivery. The tone, however, is rather quieter to-day, and quotations are easier.

Soda ash, for tierces, is quoted as follows: Leblanc ash, 48 per cent, £5@£5 10s.; 58 per cent, £5 10s.@£6 per ton, net cash. Ammonia ash, 48 per cent, £4 5s.@£4 10s.; 58 per cent, £4 10s@£4 15s. Bags 5s. per ton under price for tierces. Soda crystals are unchanged, at £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special terms for a few favored markets. Caustic soda is firm, as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash. Special quotations for the Continent and a few other export quarters.

Bleaching powder is dull on spot and for hardwood prices may be nominally called about £3 10s@£4 per ton, net cash, as to destination. In spite of the arrangement between makers, quotations for next year show little change from what have been accepted for some little time past for 1904 delivery, namely, about £4 10s.@£4 15s., f. o. b. here for hardwood.

Sulphate of ammonia is quiet. The strike of the Scotch shale miners was of very short duration and did not last long enough to effect sulphate of ammonia. The nearest value for good gray 24@25 per cent in double bags, f. o. b. here, may be called about £12 10s.@£12 12s. 6d. per ton, less 2½ per cent.

Nitrate of soda is firmly held on spot for £10@£10 10s. per ton, less 2½ per cent for double bags, f. o. b. here, as to quantity and quality.

METAL MARKET.

New York, Nov. 11.

Gold and Silver Exports and Imports,

At all United States Ports in September and Year.

	September.		Year.	
Metal	1902.	1903.	1902.	1903.
Gold:				
Exports	$530,029	$998,076	$30,996,319	$41,536,851
Imports	4,981,130	5,184,858	24,906,492	31,640,672
Excess	I. $4,451,101	I. $4,186,782	E. $6,089,827	E. $9,896,179
Silver:				
Exports	4,835,803	2,368,015	35,580,539	24,908,435
Imports	2,599,407	1,687,239	18,703,844	16,601,269
Excess	E. $2,236,396	E. $680,776	E. $16,876,695	E. $8,307,166

These exports and imports cover the totals from all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, New York.

For the week ending November 11, and for the years from January

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess, Exports or Imports.
Week..	$61,620	$891,926	$869,045	$54,225	E. $184,511
1903....	31,619,610	7,405,157	27,765,291	3,790,764	E. 48,788,980
1902....	24,759,532	3,512,041	22,732,058	1,040,381	E. 42,939,168
1901....	33,588,770	4,419,598	27,145,821	3,299,351	E. 53,015,542

The heavy imports of gold were mostly from Havana. The silver, as usual, went to London.

Business is in a hesitating condition and is quiet in most lines. The speculative markets are depressed by the raids on industrial stocks and the higher rates for money. The calls upon the banks for the West and South, usual at this season, have been large, and have made money rather scarce. Foreign exchange has gone down again, and sterling bills are now selling at a rate below the gold import point. Notwithstanding this, only $750,000 gold has been reported taken abroad, so far this week, for shipment to New York. The situation, however, may force the London banks to give way, and to make the gold shipments which they have been trying to prevent.

The statement of the New York banks—including the 56 banks represented in the Clearing House—for the week ending November 7, gives the following totals, comparison being made with the corresponding weeks of 1902 and 1901.

	1901.	1902.	1903.
Loans and discounts	$886,995,000	$875,480,600	$900,095,500
Deposits	950,419,100	885,882,200	868,044,700
Circulation	31,821,400	43,801,800	45,877,200
Specie	177,339,200	172,204,400	159,435,900
Legal tender	68,955,500	67,118,500	62,969,500
Total reserve	$246,294,700	$239,322,900	$222,405,400
Legal requirements	237,604,775	221,470,550	217,011,175
Balance surplus	$8,689,925	$17,852,350	$5,394,225

Changes for the week this year were decreases of $11,413,000 in loans and discounts, $17,571,900 in deposits, $16,700 in circulation, $5,247,900 in specie, $4,025,000 in legal tenders, and $4,879,925 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison made with the holdings at the corresponding date last year:

	1902. Gold.	1902. Silver.	1903. Gold.	1903. Silver.
N. Y. Ass'd..	$172,204,400	....	$159,435,900	....
England	167,422,170	....	162,766,880	....
France	506,576,230	$220,987,290	480,536,790	$220,821,515
Germany	157,415,000	58,220,000	159,800,000	56,125,000
Spain	71,590,000	98,400,000	72,660,000	95,520,000
Netherlands..	23,454,000	32,156,500	20,355,000	31,667,000
Belgium	14,980,000	7,490,000	15,860,000	7,930,000
Italy	81,465,000	10,202,000	102,425,000	12,016,500
Russia	359,995,000	33,435,000	390,040,000	33,965,000
Austria	229,780,000	60,620,000	231,325,000	60,560,000

The returns of the Associated Banks of New York are of date November 7, and the others November 5, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Owing to the lack of business from India, the demand for silver has slackened materially, and the price has fallen rapidly. At the decline to 26⅜d. today the market, however, closed stronger, with good buying orders.

The United States Assay Office in New York City reports receipts of 10,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to October 29, are reported by Messrs. Pixley & Abell's circular as follows:

	1902.	1903.	Changes.
India	£5,322,830	£5,105,230	D. £217,600
China	162,500	302,123	I. 139,623
Straits	492,120	721,879	I. 229,759
Total	£5,977,450	£6,129,232	I. £151,782

Receipts for the week were £165,500 in bar silver from New York, £5,000 from Chile and £37,000 from Australia; also £132,189 in Mexican dollars from the United States; total, £339,689. Shipments were £86,000 in bar silver and £26,000 in Mexican dollars to Bombay, and £15,000 in bar silver to Calcutta; total, £127,000.

Indian exchange is somewhat stronger, owing to a greater demand for remittances, and the Council bills offered in London were all sold at an average of 16d. per rupee. It is reported in London that the Indian government has completed its buying of silver for coinage, and will purchase no more for the present.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars	$0.43½	$0.47
Peruvian soles and Chinese pesos	.41	.45
Victoria sovereigns	4.85	4.88
Twenty francs	3.86	3.88
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

November	Silver—Sterling Exchange.	Silver—N. Y. Cts.	Silver—London, Pence.	Copper—Lake, Cts. per lb.	Copper—Electrolytic, Cts. per lb.	Copper—London, £ per ton.	Tin, Cts. per lb.	Lead, Cts. per lb.	Spelter—N. Y., Cts. per lb.	Spelter—St. Louis, Cts. per lb.
5	4.8420	58¾	27¼	13⅜ @13½	13¼ @13⅜	58⅛	25⅜	4.35 @4.40	5.30	5.12½
6	4.8420	58⅝	27⅛	13⅜ @13½	13¼ @13⅜	57¼	25½	4.35 @4.40	5.27½	5.10
7	4.8420	58⅞	27 1/16	13⅜ @13¼	13¼ @13⅜	....	25¼ 25⅜	4.35 @4.40	5.25	5.10
9	4.8370	58¾	27¼	13¼ @13½	13 @13¼	57¾	@ 25¼	4.35 @4.40	5.20	5.00 @5.05
10	4.83⅛	58⅛	27	13¼ @13⅜	13 @13¼	59	25¼ @ 25⅜	4.35 4.40	5.20	5.00 @5.05
11	4.83⅜	56¼	26⅝	13¼ @13⅜	13 @13¼	56⅛	25 @ 25¼	4.35 @4 40	5.20	5.00 @5.05

London quotations are per long ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wire-bars: the price of electrolytic cathodes is usually 0.25c. lower than these figures

Copper.—The market has ruled rather dull until to-day, when the report came out that the mines and smelting works of the Amalgamated Copper Co. are about to resume operations. This news caused a sharp break. However, it is not unlikely that at the lower values established consumers will again enter the market more freely, especially in Europe, where business seems to be very satisfactory indeed.

The coal strike in Colorado may eventually affect the production of copper in Arizona, as a number of mines are being supplied with fuel from the former district.

The closing quotations are given as 13⅛@13⅜c. for Lake; 13@13¼c. for electrolytic in ingots, cakes and wire bars; 12¾@13c., for cathodes; 12⅝@12⅞c., for casting copper.

The market for standard copper in London, which closed last week at £57 5s., opened on Monday at £57 15s., advanced on Tuesday to £59, and the closing quotations on Wednesday are cabled as £56 2s. 6d.@ £56 5s. for spot, £55 15s.@£55 17s. 6d. for three months.

It is reported that a strike has broken out at the mines of the Rio Tinto Co. in Spain.

Refined and manufactured sorts we quote: English tough, £60@£60 10s.; best selected, £62@£62 10s.; strong sheets, £68@£68 10s.; India sheets, £65@£65 10s.; yellow metal, 6¼d.@6⅝d.

Exports and imports of copper at New York, Philadelphia and Baltimore, in the week of November 10, and for the year to date, were in long tons:

	Week.	Year.
Austria	45	4,821
Belgium	...	1,125
France	1,425	19,000
Germany	1,593	24,615
Holland	1,141	34,590
Italy	219	2,743
United Kingdom	159	14,815
Other countries	...	4,572
Total copper	4,582	106,281
Matte	...	286
Imports—		
Copper	685	23,360
Matte	...	984
Ore	3,704	39,059

Exports have been heavy, especially to France and Germany. The imports of copper were from Mexico and Japan, while the ore was from Canada.

Imports and exports of copper in Germany for the nine months ending September 30 were as follows, in metric tons:

	1902.	1903.	Changes.
Imports	58,818	59,561	I. 743
Exports	3,497	3,596	I. 99
Balance	55,321	55,965	I. 644

In addition to the imports of metal, there were 10,728 tons of copper ore imported, a decrease of 377 tons from last year. Exports of copper ore were 11,730 tons, a decrease of 1,247 tons from last year.

Chilean Copper Market.—Messrs. Jackson Brothers report from Valparaiso, Chile, under date of September 16, that recent sales of bar copper amounted to 8,289 qtls., the average price being $33.50, Chilean currency, per qtl. About 300 tons of copper matte were sold at a price averaging $14.50, Chilean currency, per qtl., on a basis of 50% copper. No sales of copper ore reported.

Tin continues on its downward course, and lower prices have been accepted from day to day. The lower quotations for both exchange and silver have had a depressing influence, and at the close we quote 25@ 25¼c. for spot and futures.

The foreign market, which closed last week at £115 17s. 6d. opened on Monday at £115 10s. advanced on Tuesday to £116, and the closing quotations on Wednesday are cabled as £115 5s.@£115 7s. 6d. for spot, £116 5s.@£116 7s. 6d. for three months.

Imports of tin into Germany for the nine months ending September 30 were 9,895 metric tons, against 10,024 tons in the corresponding period last year, showing a decrease of 129 tons.

Lead is quiet and dull. The closing quotations are 4.20@4.32½c., St. Louis; 4.35@4.40, New York.

The foreign market is easy, Spanish lead being quoted at £11 1s. 3d.@£11 2s. 6d., English lead £11 3s. 9d.@£11 5s.

Imports and exports of lead in Germany for the nine months ending September 30 were as follows, in metric tons:

	1902.	1903.	Changes.
Imports	28,897	38,121	I. 9,224
Exports	17,311	22,180	I. 4,869
Balance	11,586	15,941	I. 4,355

These imports include pig lead and scrap. In addition, there were imported 58,134 tons of lead ore and base bullion, an increase of 1,228 tons over last year.

Spanish Lead Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of October 24, that the price of silver during the week has been 14.75 reales per oz. Exchange has gone down again, and is now 33.32 pesetas to £1. The local quotation for pig lead has been 60 reales per qtl., which, on current exchange, is equal to £10 1s. 9d. per ton of 2,240 lb., f. o. b., Cartagena. Exports for the week were 695,573 kg. pig lead, and 220,000 kg. desilverized, all to Marseilles. There were also 1,189 kg. bar silver shipped to the same port.

Spelter is again lower, and the few orders which present themselves are eagerly competed for. The closing quotations are 5@5.05c., St. Louis; 5.17½@ 5.22½c., New York.

The foreign market is firm, good ordinaries being quoted at £21, specials £21 5s.

Silesian Spelter Market.—According to information received from Mr. Paul Speier, under date of October 30, the general tendency of the market has been quiet, and prices have fluctuated within narrow margins. The prices in marks per 1,000 kg. during 1903 have been: First quarter, 405 marks; second quarter, 406 marks; third quarter, 392 marks, which is equivalent to 4.27c. per lb., these prices being reckoned upon the new basis. The output of the smelters in Upper Silesia during the first half-year was 58,430 metric tons, as compared with 57,493 tons in the same period of 1901. The exports for the first nine months of the year show a considerable decline as compared with those of the preceding year. Business in sheet zinc is quiet, and prices have declined about 1 mark per 100 kg. The production in Upper Silesia during the first semister of 1903 was 19,002 tons, against 19,289 tons in the same period of 1902. Zinc dust is firmly held, and orders are being given for immediate and future deliveries. There has been some increase lately in imports of zinc ores.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of October 24, that there are large stocks at nearly all the mines, several miners holding as much as 50,000 or 60,000 qtls. Buyers are offering 7 to 8 reales on a basis of 30% zinc, but miners are holding out for 10 reales. There seems to be no prospect of reconciling these differences. Exports for the week were 3,500 tons blende to Antwerp.

Antimony is dull and we quote: Cookson's 6¾@ 7¼c.; Hallett's, 6¼@6⅝c.; U. S., 6@6¼c.; Italian, French and Japanese, 5¾@5⅞c.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Platinum.—Demand continues steady and the price remains at $19 per oz.

Messrs. Eimer & Amend, of New York, quote prices for platinum in manufactured forms as follows: Heavy sheet and rod, 72c. per gram; foil and wire, 75c. per gram; platinum crucibles and dishes, 77c. per gram; perforated wire, like cones, Gooch crucibles, etc., 82c. per gram.

Quicksilver.—The New York price is $1 lower at $46.50 per flask for large lots, while a slightly higher figure is quoted for smaller orders. The San Francisco quotations are lower at $44@$45 per flask for domestic orders and about $41.50 for export. The London price is £8 7s. 6d. per flask, with the same quotation asked by second hands.

Cadmium.—Herr Paul Speier, writing from Breslau, Germany, reports that the quotation is very firm. The price for metallic cadmium, 99.5 per cent, is 675 marks per 100 kg. delivered in Breslau.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Aluminum	Per lb.
No. 1, 98% ingots	33@37c.
No. 2, 95% ingots	31@34c.
Rolled Sheets	4c. up
Alum-bronze	20@23c.
Nickel-alum	33@39c.
Bismuth	$2.10
Chromium, pure (N. Y.)	80c.
Copper, red oxide	50c.
Ferro-Molybde'm (50%)	$1.25
Ferro-Titanium (10%)	90c.
Ferro-Titanium (20@25% N. Y.)	55c.

	Per lb
Ferro-Tungsten (37½)	38c.
Magnesium, pure (N. Y.)	60c.
Manganese	$2.75
Mangan'e Cop. (20% Mn)	32c.
Mangan'e Cop. (30% Mn)	38c.
Molybdenum (Best)	$1.82
Phosphorus, foreign	45c.
Phosphorus, American	70c.
Sodium metal	50c.
Tungsten (Best)	62c.

Variations in price depend chiefly on size of order.

Missouri Zinc Ore Market. Nov. 7.

(From Our Special Correspondent.)

The highest price paid for zinc during the week was $38 per ton for a few choice bins, the assay basis in a few instances being stronger and ranging from $33 to $35 per ton of 60% zinc.

Following are the sales of zinc and lead ores from the various camps of the Joplin district for the week:

	Zinc, lb.	Lead, lb.	Value.
Joplin	2,211,760	292,400	$49,360
Webb City-Carterville	1,232,880	473,760	32,225
Galena-Empire	1,141,500	173,200	20,830
Alba-Neck	774,280	....	13,960
Duenweg	453,320	117,620	10,745
Aurora	410,020	7,020	5,560
Granby	366,000	21,000	4,845
Carl Junction	279,830	....	4,755
Zincite	263,960	5,690	4,515
Prosperity	99,290	19,320	2,170
Spurgeon	32,850	46,760	1,695
Central City	68,890	26,920	1,570
Cave Springs	63,200	6,630	1,320
Carthage	45,960	....	735
Totals	7,443,740	1,219,350	$149,315
Forty-five weeks	418,539,470	49,721,470	$8,501,140

Zinc value, the week, $115,505; 45 weeks, $7,152,150.

Lead value, the week, $33,810; 45 weeks, $1,348,900.

Further curtailment of the output has been deferred, the order for a shut-down next week having been rescinded. Zinc ore prices have assumed a steady basis, and although the price is lower than the Missouri & Kansas Zinc Miners' Association think should be paid, yet they are loath to disturb the situation at this time in order to obtain recognition on this point. It is assumed by the association that the smelters can well afford to pay a $36 to $37 basis on the present St. Louis quotations, especially after buying all summer at a rate lower than the Paxton schedule of 1900, which, when issued, was an accepted authority from the smelters' point of view.

Average Prices of Metals per lb., New York.

Month.	Tin.		Lead.		Spelter.	
	1903	1902.	1903.	1902.	1903.	1902.
January	28.33	23.54	4.075	4.000	4.865	4.27
February	29.43	24.07	4.075	4.075	5.043	4.15
March	30.15	26.32	4.442	4.075	5.349	4.28
April	29.81	27.77	4.567	4.075	5.550	4.37
May	23.51	23.85	4 325	4.075	5.639	4.47
June	28.34	29.36	4.210	4.075	5.697	4.96
July	27.68	28.38	4.075	4.075	5.662	5.27
August	28.29	28.23	4.075	4.075	5.725	5.44
September	26.77	26.60	4.243	4.075	5.686	5.49
October	25.92	26.07	4 375	4.075	5.51	5.38
November	.....	25.68	.....	4.075	.....	5.18
December	.....	25.68	.....	4.075	.....	4.78
Year	.....	26.79	.....	4.069	.....	4.84

NOTE.—The average price of spelter in St. Louis for the month of January, 1903, was 4.689c. per lb.; for February, 4.681c.; for March, 5.174c.; for April, 5.375c.; for May, 5.469c.; for June, 5.537c.; for July, 5.507c; August, 5.55c. September 5.514c.; for October, 5.35c.

Average Prices of Copper.

Month.	New York.				London.	
	Electrolytic.		Lake.		Standard.	
	1903.	1902.	1903.	1902.	1903.	1902.
January	12.159	11.053	12.361	11.322	53.52	48.43
February	12.778	12.173	12.901	12.378	57.34	55.16
March	14.416	11.882	14.572	12.188	63 85	53.39
April	14.454	11.618	14.642	11.886	61.72	52.79
May	14.435	11.856	14.618	12.226	61.73	54.03
June	13.542	12.110	14.212	12.360	57.30	53.93
July	13 094	11.771	13.341	11.923	56.64	52.89
August	12.962	11.404	13.159	11.649	58.44	51.96
September	13.205	11.480	13.345	11.760	56.82	52.68
October	12.801	11.449	12.954	11.722	55.60	52.18
November	.....	11.288	.....	11.553	.....	51.08
December	.....	11.430	.....	11.599	.....	50.95
Year	.....	11.626	.....	11.887	.....	52 46

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1903		1902.		1901.	
	London Pence.	N. Y., Cents.	London. Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents.
January	21.98	45.57	25.62	55.56	28.97	62.82
February	22.11	47.89	25.41	55.09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.23
April	23.38	50.56	24.34	52 72	27.30	59.29
May	24.89	54.11	23.71	51.31	27.43	59.64
June	24.29	52.86	24.17	52.36	27.42	59.57
July	24.86	53.92	24.38	52.84	26.96	58.46
August	25.63	55.36	24.23	52.52	26.94	58.37
September	26.75	58.00	23.88	51.52	26.95	58.26
October	27.89	60.36	23.40	50.57	26.62	57.59
November	.....	.....	22.70	49.07	26.12	56.64
December	.....	.....	22.21	48.03	25.46	55.10
Year	.....	.....	24.09	52.16	27.11	58.95

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Name of company.	Date.	Per share.	Total.	Total to date.
†Amalgamated Copper	Nov. 30	.50	769,430	22,761,400
‡Anaconda Copper	Nov. 16	.50	600,000	23,250,000
Bunker Hill & Sull., Ida.	Nov. 5	.10	30,000	1,490,000
*Central Lead, Mo.	Nov. 16	.50	5,000	385,000
Columbus & H'king C. & I.	Nov. 14	.25	17,311	86,531
*Daly West, Utah	Nov. 16	.65	117.000	3,357,000
*Four Oil, Cal.	Nov. 16	.01	2,087	50,088
†General Chemical, com.	Dec. 1	1.25	92,629	1,300,537
Grand Central, Utah	Nov. 14	.10	25.000	891,250
‡Lehigh Coal & Nav.	Nov. 27	1.50	286,933	20,668,986
N. Y. & Hond., Rosario	Nov. 21	.10	15,000	1,785,000
Shelby Iron, Ala.	Nov. 16	5.00	50,000	840,000
†U. S. Steel, com.	Dec. 30	.50	2,541.513	53,350,978
†U. S. Steel, pf.	Nov. 16	1.75	8,929,919	98,192,496

*Monthly. †Quarterly. ‡Semi-annually.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
Belcher	Nev.	..	Nov. 17	Dec. 8	.10
Best & Belcher	Nev.	..	Nov. 6	Nov. 27	.10
Brunswick Con.	Cal.	..	Nov. 27	.....	.03
Canton Placer	Cal.	..	Nov. 18	.....	.01½
Coe	Cal.	..	Nov. 19,	.....	.04
Confidence	Nov.	..	Nov. 25	.....	.20
Con. New York	Nev.	..	Dec. 1	Dec. 23	.10
Elephant	Utah	..	Dec. 1	Dec. 21	.01
Golden West	Cal.	1	Oct. 24	Nov. 18	.01
Grizzly	Cal.	..	Nov. 30	.....	.10
Justice	Nev.	..	Nov. 17	Dec. 5	.10
Kentuck Con.	Nev.	..	Nov. 4	Nov. 25	.03
Jubilee	Cal.	..	Dec. 7	.....	.05
Larkin	Cal.	15	Oct. 26	Nov. 16	.02½
New Almaden Quicksilver	Mex.	..	Dec. 28	.....	.00½
Occidental Con.	Nev.	43	Nov. 6	Nov. 27	.05
Park City Superior	Utah	..	Dec. 7	Dec. 24	.00½
Peruvian Con.	Utah	10	Nov. 3	Nov. 18	.01½
Potosi	Nev.	..	Dec. 8	.....	.10
Savage	Nev.	..	Dec. 8	.....	.10
Seg. Belcher & Mides Con.	Nev.	..	Nov. 4	Nov. 24	.05
Sierra Nevada	Nev.	..	Dec. 8	.....	.10
Silver Queen	Utah	1	Nov. 25	Dec. 15	.00¼
South Eureka	Cal.	..	Nov. 27	.....	.02
Willietta	Cal.	7	Oct. 27	Nov. 17	.01

STOCK QUOTATIONS

NEW YORK.

Company and Location.	Par val	Shares Listed.	Nov. 4 H.	Nov. 4 L.	Nov. 5 H.	Nov. 5 L.	Nov. 6 H.	Nov. 6 L.	Nov. 7 H.	Nov. 7 L.	Nov. 9 H.	Nov. 9 L.	Nov. 10 H.	Nov. 10 L.	Sales.
Acacia Colo., g.	1	1,500,000													
Amalgamated Mont c.	100	1,538,879	30½	33¼	38¼	35⅛	36½	35⅝	36¾	35½	37	36⅛	38⅛	36	198,780
†Anaconda Mont., c.	25	1,200,000	66	...	65	...	62						66	65	700
Belcher, Nev., s.	3	104,000	...	...	...	...	.13	.12							40
Best & Belcher, Nev., s	3	100,800	...	...	1.40	...	...	...							100
Brunswick, Cor. Cal., g	5	100,000													
Bullion, Nev., s.	1	100,000													
Caledonia, Nev., s	1	100,000	1.20	...	...	...	1.10	...	...	...	...	...	...	...	500
Challar, Nev., s., g.	2½	412,000													
Confidence, Nev.	3	24,960											.70	...	200
C. K. & N., Colo.	1	1,500,000	.20										1.05	...	500
Con. Cal. & Va., Nev., g. s	2½	216,000	1.15	...	1.15	...	1.15	...	...	...	...	...	...	...	700
Con. Imperial, Colo.	1	500,000			.03										300
Cripple Creek Con., g.	1	2,000,000	...	...	...	...	...	...	...	...	...	...	...	...	
Crown Point, Nev.	2½	100,000											15	14	70
Daly, Utah, g. s. l.	20	150,000	1.85	...	...	...	...	...	...	...	...	...	...	...	100
Elkton, Colo., g.	1	1,250,000	...	...	...	...	.40	...	1.40	...	...	...	.45	...	1,000
El Paso, Colo., g.	1	650,000													
Gold Dollar, Colo.	1	500,000													
Golden Fleece, Colo., g	1	600,000	.08												500
Greene Con., Mex., c.	10	720,000	14¾	16½	16⅛	15⅛	15⅛	14¾	14¾	14¾	15	14⅞	15	14⅜	7,005
Hale Norcross, Nev., s	2½	112,000											.58	.57	300
Homestake, S. D., g.	100	218,400													
Horn Silver, Utah	20	400,000													
Iron Silver, Colo.	20	500,000													
Isabella, Colo., g.	1	400,000							11						1,000
Justice, Nev.	2	105,000	.05												1,000
Mexican, Nev., s.	3	103,800	.95	.94									.90		500
Mollie Gibson, Colo., g	5	1,000,000					.06								1,000
Moon Anchor, Colo., g	5	400,000	.11										.13		1,500
Moulton, Mont., g.	25	50,000													
Occidental, Nev., s.	3	100,000													
Ontario, Utah	100	150,000	5.25												50
Ophir, Nev., s.	3	100,800			1.40		1.40								200
Overman, Nev.	2	115,200					.22								500
Pharmacist, Colo., g.	1	1,500,000													
Phoenix, I., Ariz.	1														
Portland, Colo., g.	1	3,000,000			1.15										200
Potosi, Nev. s	1	112,000					.12						.12		2,000
Quicksilver, pf	100	43,000			5.50										100
Silver Hill, Nev.	1	100,000			.53								.63		200
Standard, Cal. g.	10	178,304			2.40		2.25		2.30	2.25			.30		450
Tenn., Tenn., c.	25	175,000	30½				.30¼	.30						28½	930
Union Con., Nev., g. s	1	100,000			.50	.48									300
Union Copper, N. C.	25	750,000	¾					¾			¾		¾		1,000
United, Mont., com., c	100	300,000	16½		16½		16½	16⅜	16⅜	16¼	16¾	16½	17	16¾	1,300
Utah, Nev.	1	100,000					.15								500
Virginia, M., Colo., g.	1	1,000,000													
White Knob, Idaho, c.	10	200,000	10		9¼						9¼	9			1,500
Yellow Jacket, Nev., s	3	120,000													

c—Copper. g—Gold. l—Lead. s—Silver. Total sales, 220,365 shares. †Ex-dividend.

COLORADO SPRINGS (By Telegraph).

Name of Company.	Nov. 9. H.	Nov. 9. L.	Nov. 10. H.	Nov. 10. L.	Name of Company.	Nov 9. H.	Nov 9. L.	Nov. 10. H.	Nov. 10. L.
Acacia	.03	.05	.03	.05	Jack Pot	.05	.04	.05½	.04
Am. Con	.01⅝	.01¼	.01⅝	.01½	Keystone	.02¼	.01⅞	.02¼	.01½
Anaconda	.11¾	.10½	.11¾	.10½	Last Dollar	.50	.49	.50	.49
Colo. City & Manitou	.02	.01	.02	.01	Lexington	.03½	.03	.03½	.03
Cripple Creek Con	.03½	.03	.03½	.03	Little Puck	.02¼	.02	.02¾	.02
C. K. & N.	.20½	.20¼	.20⅝	.20¼	Mollie Gibson	.05	.04¾	.05	.04¾
Doctor-Jack Pot	.08	.04	.08	.04	Moon Anchor	.10	.09	.10	.09
Elkton Con	.43	.40	43	.40	New Haven	.02½	.02¼	.02¼	.02
El Paso	.50½	.49	.50½	.50	Old Gold	.09⅝	.09¼	.09⅝	.09¼
Gold Dollar Con	.03⅛	.02⅛	.03⅛	.02⅜	Pharmacist	.02¾	.02	.02¾	.02
Golden Cycle	.65	.63	.65	.63	Pinnacle	.03	.02¾	.03	.02¾
Golden Fleece	.15	.05	.15	.05	Portland	1.10	.90	1.10	.90
Gold Soverign	.03	.02½	.03	.02¾	Vindicator	.80	.79½	.80	.79½
Isabella	.13	.09½	.10	.09½	Work	.04¾	.04½	.04¾	.04

COLORADO SPRINGS, COLO.*

†Name of Company.	Par Val	Shares Listed.	Oct. 31 H.	Oct. 31 L.	Nov. 2 H.	Nov. 2 L.	Nov. 3* H.	Nov. 3* L.	Nov. 4 H.	Nov. 4 L.	Nov. 5 H.	Nov. 5 L.	Nov. 6 H.	Nov. 6 L.	Sales
Acacia	$1	1,500,000	.07¾	.06	.07½	.06			.03¼	.05⅜	.06	.05½	.06	.05½	2,000
American Con	1	2,000,000	.02		.02						.02		.02		
Anaconda	5	1,000,000	.12½	.10½	.12½	.10½			.12		.12¼	.11¾	.13	.11	2,000
Colo. City & Manitou	1	1,000,000	.02		.02				.01⅞		.01⅞	.01	.01¾		3,000
C. K. & N.	1	1,250,000	.21¾	.21	.21¾	.21			.22	.21	.21¾	.21	.21½	.20⅞	3,000
Cripple Creek Con	1	2,030,000	.03⅞	.03½	.03⅝	.03½			.03¾	.03	.04		.03½	.03	
Des Moines	1	750,000	.02		.02				.02		.02	.01	.02	.01	
Doctor Jack Pot	1	2,900,000	.09	.08	.08½	.08			.08¾	.08	.08½		.09		
Elkton Con	1	1,250,000	.43	.42	.44	.42½			.44	.42¾	.45	.42	.44	.41	3,222
El Paso	1	900,000	.55	.53	.55	.52¾			.53¾	.53	.53½	.52¾	.52		4,078
Findley	1	1,250,000													
Gold Dollar Con	1	500,000	.03¾	.03⅝	.03¾	.03⅝			.03¾	.03⅝	.03⅝	.03½	.03⅝	.03	14,350
Gold Sovereign	1	1,000,000	.03¼	.03	.03¾	.03			.03⅛	.03	.02⅞	.02¾	.03	.02¾	4,000
Golden Cycle	1	2,000,000	.35	63½	.65	.63½			.65	.63	.65	.63½	.65	.63	1,500
Golden Fleece	1	600,000	.12		.12				.12		.06		.06		
Gould	1	1,250,000													2,000
Hart	1	1,000,000	.02		.01¼				.02		.03½		.03½		
Isabella	1	3,000,000	.10½	.10⅛	.10⅛	.10			.10¼	.10	.10¼	.09⅝	.10	.09⅝	8,000
Jack Pot	1	1,250,000	.08	.05	.05				.05		.05		.05		
Keystone	1	1,500,000	.02¼	.02	.02¼	.02			.02¼	.02	.02¼	.02	.02¼	.01⅞	1,000
Last Dollar	1	1,500,000	.50		.50				.50		.49		.50		
Lexington	1	1,500,000	.03½		.03½				.03½		.03¾	.03½	.03½		
Little Puck	1	2,000,000	.02¼		.02¼	.02			.02¼	.02	.02⅛	.02	.02⅛	.02	4,000
Mollie Gibson	5	1,000,000			.05				.05		.05		.05		
Moon-Anchor	5	400,000	.10½	.09½	.10⅞	.10			.11	.10	.11	.10	.11	.10	4,000
New Haven	1	1,500,000	.02¼		.02¼				.02¼		.02¼		.02⅛		
Old Gold	1	1,800,000													
Pharmacist, Con	1	1,500,000	.02¼	.02⅛	.02¾	.02¼			.02¾	.02	.02¾	.02¼	.02¾	.02¼	1,000
Pinnacle	1	2,000,000	.03		.03				.03		.03		.03		
Portland	1	3,000,000	1.12	1.07	1.12	1.05			1.12	1.10	1.12		1.10	.83	1,100
Vindicator Con	1	1,500,000	.80		.85				.80		.80		.80		
Work	1	1,500,000	.05	.04¼	.05	.04¾			.05	.04½	.04¾	.04½	.04¾	.04½	4,000

Colo. Springs Mining Stock Exchange. †All gold mines in Colorado. Total sales. 83,250 shares.
*Holiday.

SAN FRANCISCO (By Telegraph).

Name of Company.	Shares Issued.	November. 9.	November. 10.	Name of Company.	Shares Issued.	November. 9.	November. 10.
Belcher	104,000	.12	.11	Justice	105,000	.03	.02
Best & Belcher	100,800	1.35	1.35	Mexican	100,800	.91	.85
Caledonia	100,000	1.05	1.00	Occidental Con	100,000	.25	.25
Challenge Con	50,000	.24	.21	Ophir	100,800	1.50	1.45
Challar	112,000	.12	.12	Overman	115,200	.20	.16
Confidence	24,960	.72	.70	Potosi	112,000	.12	.11
Con. California & Virginia	216,000	1.05	1.05	Savage	112,000	.18	.15
Con. Imperial	500,000	.03	.03	Sierra Nevada	100,000	.37	.33
Crown Point	100,000	.14	.13	Union Con	100,000	.48	.43
Gould & Curry	108,000	.23	.21	Utah Con	100,000	.14	.13
Hale & Norcross	112,000	.60	.53	Yellow Jacket	120,000	.39	.37

COAL, IRON AND INDUSTRIAL STOCKS.

Name of Company.	Par val.	Shares Issued.	Nov. 4 H.	Nov. 4 L.	Nov. 5 H.	Nov. 5 L.	Nov. 6 H.	Nov. 6 L.	Nov. 7 H.	Nov. 7 L.	Nov. 9 H.	Nov. 9 L.	Nov. 10 H.	Nov. 10 L.	Sales
Allis-Chalmers	$100	200,000											8		100
Allis-Cham's, pf	100	162,500													
Am. Agr. Chem	100	172,158													
Am. Agr. Chem. pf.	100	181,350													
Am. Sm. & Ref.	100	500,000	43¾	43⅜	43½	41⅜	42¼	41⅜	42⅜	42	42⅞	42¾	42⅜	41½	11,410
Am. Sm. & Ref., pf	100	500,000	88	87⅝	87¾	87	87	86	87	88½	88	87	87		2,102
Am. Steel Fdy	100	200,000													
Am. S. & Fdy., pf	100	200,000									45				200
Col. Fuel & I., Colo.	100	239,310	32½	30⅛	30	29¼	30	28	28¼	27¾	28⅜	27	28½	26	3,490
Col. & H. C. & I., Colo.	100	69,244					10¾								100
Crucible Steel	100	250,000	4⅜	4	4¼	4	4	3⅝	4	3⅝			3⅝	3½	1,385
Crucible Steel, pf.	100	250,000	31¾		32½	31	30⅜	30	30		30	29⅞	32	29¼	1,641
Mong. R. Coal, Pa.	50	200,000			28								27½		67
Mong. R. Coal, pf, Pa.	50	97,300					27½				27½				45
National Lead	100	149,054	13		11½								12		325
National Lead, pf	100	149,040											78		100
Phila. Nat. Gas	100	308,542					35¾	35½					31½		80
Phila. Nat. Gas, pf.	100	212,873													
Pittsburg Coal, Pa.	100	300,307	20				19¾	19⅝	19¼	19	18¾	18½	18¾		1,845
Pittsburg Coal, pf.	100	297,012	62¼	61⅞	62	60½	60½	60	60½	60	60	59⅞	60		2,085
Republic I. & S.	100	273,560	7¾		7⅞	6¾	6¾		6¾		6¾	7	7		3,750
Republic I. & S., pf.	100	204,169	52	50	50½	48¾	49	48	50½	48¾	50	49	49½	48½	32,150
Sloss-Shef S. & I., Ala.	100	75,000			24½	24			23						300
Sloss-Shef S. & I. pf, Ala	100	65,085	70												20
Standard Oil	100	970,000	672	665	667		662	660	658	657	655	650	650	645	291
Tenn. C. I. & R.R.	100	225,000	29¾	28¾	28¼	27½	27½	26⅝	27¼	26⅝	28	26¼	27	25⅞	15,890
U.S. Red. & Ref.	100	59,188			10⅜										100
U. S. Red & Ref., pf.	100	39,458													
‡U.S. Steel Corp.	100	5,084,952	13½	12⅜	12⅜	10⅝	11⅜	10½	11⅜	10⅝	11¾	10⅜	10⅜	10	248,206
U. S. Steel Corp. pf.	100	5,103,141	59⅜	57½	57½	54⅜	54⅝	52	53⅞	52	53⅞	50½	51¼	49¼	80,474
Va.-Car Chem.	100	279,844	20½		20⅝	19					20		86¼		800
Va.-Car Chem., pf.	100	120,000	88½		87¼		87¼								135
Va. I., Coal & Coke	100	80,416													

†Ex-dividend Total sales, 1,214,861 shares.

. BOSTON, MASS.

Name of Company.	Par val	Shares listed	Nov. 4 H.	Nov. 4 L.	Nov. 5 H.	Nov. 5 L.	Nov. 6 H.	Nov. 6 L.	Nov. 7 H.	Nov. 7 L.	Nov. 9 H.	Nov. 9 L.	Nov. 10 H.	Nov. 10 L.	Sales.
Adventure Con., c.	$25	100,000	4½	...	4½	4	4¼	4	...	...	4¼	4	...	...	300
Allouez, c.	25	99,511	5	...	4¾	4⅛	4½				4¾	4½	...	...	403
Amalgamated, c.	100	1,538,879	39½	38½	38⅜	36¼	38⅜	35½	36⅜	35⅞	37	36¼	38⅝	36¼	28,257
Am. Gold Dredging	5	90,000													
Am. Zinc, Lead & Sm.	25	60,000	9½	8½							9				170
Anaconda, c. s.	25	1,200,000													
Arcadian, c.	25	150,000					1.00	.90			87½				175
Arnold, c.	25	60,000													
Atlantic, c.	25	100,000			8¼		8						8¼		335
Bingham Con. g. s.	50	150,000	23		23						22½	22	22		550
Bonanza Dev. g.	10	300,000					50								150
Breece, s. l.	25	100,000													
British Columbia, c.	5	256,800													
Calumet & Hecla, c.	25	100,000	450		435				435		435		435		38
Centennial, c.	25	90,000	17		16¾	16½	16¼		16½	16	16⅝	16¼	16½	16¼	1,370
Central Oil.	25	60,050							6¾						15
Con. Mercur, g.	5	1,000,000	1.00	.95	.98		.98	.95	.98		1.00	.90	.90		2,620
Copper Range Con.	100	379,848	48¼	48⅛	47	45	45	44¾	45⅝	44½	45¾	44⅛	45⅝	44½	19,663
†Daly West, g. s. l.	20	180,000	37¾	37	38	37½	37¾		37⅞	37½	38	37½	37½		550
Dominion Coal.	100	150,000	76½	74	74	72	72¾	71¾	73½	73	74		74¾	74½	1,305
Dominion Coal, pf.	100	30,000			115										10
Dominion I. & S.	100	100,000	8½		8¾	7½	7½	6¼	7¾	7	7½	6⅞	8¾	7¾	2,800
Elm River, c.	12	100,000			2½	2¼									120
Franklin, c.	25	100,000	8¼				8	7¼	8						110
Granby Con. g. s. c.	10	1,336,303	4		4		4				4¼	4⅛	4¼		2,015
Guanajuato Con. g.	5	385,000													
Isle Royal Con., c.	25	385,000			6½						5½				15
Mass Con., c.	25	100,000	4¾		5	4⅞	5	4¾			5				210
Mayflower, c.	25	100,000			1										25
Michigan, c.	25	100,000							6¼						40
Mohawk, c.	25	100,000	38	36¾	37	36¾	37	36	36¾		36¾	36¾	36¾	36½	1,302
Mont. Coal & Coke	25	200,000	2												100
Mont'l & Boston, c.	5	570,000	.70			.65					.62½		.62½		1,000
New Idria, q.	5	100,000											10		100
Nova Scotia St. & C.	100	37,623	75½												50
Nova Scotia St. & C., pf.	100	10,300													
Old Colony, c.	25	100,000						1			1¼				750
Old Dominion, c.	25	150,000	12	11¾	11½		11	10			15⅜	10	10⅜	10⅜	1,296
Osceola, c.	25	96,150	58½	57	57		56	55	55		57	56			710
Parrot, s. c.	10	229,850	18¼	18	18¼	18¼	18		18						330
Phœnix Con, c.	25	100,000	3⅜	3½			3⅛						4	3¾	245
Quincy, c.	25	100,000	90				85				87		85		34
Rhode Island, c.	25	100,000													
Santa Fe, g. c.	10	250,000	2 1/16	2	2		2						2		660
Shannon, c.	10	298,913	9	8⅜	9	8¾	8¾	8½	9	8½	8½		8¾	8¼	2,259
Tamarack, c.	25	60,000			95		94	92			95	90½	97½	85	212
Tecumseh, c.	25	80,000													
Tennessee, c.	25	175,000													
Trinity, c.	25	160,000	5½		5½	5¼	5½	5¼	5½	5¼	5¼	5	4⅞	5¼	710
United c.	100	450,000													
United States, g.	10	300,000	18¼	17⅞	17¾	17½	17⅜	17⅛	17½		17¾		17¾	17⅝	1,591
U. S. Coal & Oil.	25	240,000	9¼	9⅛		9	8⅞	9¼	8⅞						400
Utah Con., g. c.	5	231,093	28	27½	27¾	27¼	27	26¼	28	27	27½	27	27½	26¼	3,471
Victoria, c.	25	100,000	2¾	2⅝									2¾		600
Winona, c.	25	100,000	8		8	7¾	8	7⅝	8¼	8	8½	8⅛	8		613
Wolverine, c.	25	80,000	66	65⅝	66	64			64½				66		161
Wyandot, c.	25	100,000			1										150

†Ex-dividend. ‡Assessment Paid. Total sales, 76,252 shares. c—Copper. g—Gold. l—Lead.
q—Quicksilver. s—Silver. *Holiday.

SAN FRANCISCO.*

Name of Company.	Location.	Capitalization.	Oct. 30 H.	Oct. 30 L.	Oct. 31 H.	Oct. 31 L.	Nov. 2 H.	Nov. 2 L.	Nov. 3 H.	Nov. 3 L.	Nov. 4 H.	Nov. 4 L.	Nov. 5 H.	Nov. 5 L.	Sales
Bunker Hill	Cal.	200,000											.80		250
Central Eureka g.	Cal.	400,000													
Draper Gold Mg. Co.	Cal.	500,000													
Esperanza g.	Nev.	1,000,000	.02		.02		.02		.02		.02				65,200
Golconda Con. g.	Ore.	3,000,000							.19						500
Gold Hit. Con. g.	Nev.	750,000													
Hannapah g.	Nev.	1,000,000					.08		.08		.10		.10		1,550
Lightner Mg. Co.	Cal.	125,000							4.00						1,000
MacNamara g.	Nev.	500,000	.13										.11	.13	1,000
Montana-Tonopah, g.	Nev.	1,000,000	.90		.88				.90		.90		.92		2,000
N. Y. Tonopah, g.	Nev.	1,000,000													
Oriole g.	Cal.	200,000													
Pine Grove, g.	Nev.	1,000,000													
Rescue, g.	Nev.	1,000,000					.05	.04					.05	.04	5,000
South Eureka	Cal.	300,000											.08		1,000
Tonopah-Belmont, g.	Nev.	2,000,000			1.00										50
Tonopah & Cal., g.	Nev.	2,000,000													
Tonapah & Gt. West'n	Nev.	750,000													
Tonopah, g.	Nev.	1,600,000											5.76		100
Tonopah North Star, g	Nev.	750,000	.34	.33			.32		.33	.32			.32	.31	5,450
Tonopah & Salt Lake	Nev.	300,000					.15				.17				200
Tonopah Midway	Nev.	750,000	.37										.35		1,100

g—Gold. *San Francisco and Tonopah Mining Exchange. Total sales, 78,650 shares.

STOCK QUOTATIONS

MEXICO.* Oct. 30

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango:				
Ca. Min. de Penoles..	2,500	$50.00	$3,800	$4,100
San Andres de la Sierra	200	.....	10,000	.....
Guanajuato:				
Angustias, Pozos....	2,400	5.00	75	80
Cinco Senores y An., aviadoras.....	2,000	15.00	100	110
Cinco Senores y An., aviada	400	10.00	90	95
Providencia, San Juan de la Luz.....	6,000	2.00	90	97
Queensland y Australia.....	300	.....	70	80
Guerrero:				
Delfina, 1st serie.....	2,500	.....	35	40
Delfina, 2nd serie....	2,500	.....	30	40
Garduno y Anexas...	7,200	.....	40	50
Hidalgo:				
Amistad y Condordia	9,600	8.87	89	84
Carmen, aviada.....	1,100	.....	140	160
Guadalupe Fresnillo Mill	1,000	.....	180	250
Guadalupe Fresnillo Mine.....	1,400	.....	70	80
La Blanca, aviadora.	1,536	.....	.....	.....
La Blanca, aviada....	768	.....	.....	.....
La Reina y An., aviadora.....	5,600	.....	18	20
Luz de Maravillas, aviadas.....	1,100	.....	.....	20
Maravillas y An., aviador.....	1,680	.....	120	140
Maravillas el Lobo ..	1,000	.....	130	180
Palma y An., aviador.....	1,800	.....	.....	12
Real del Monte.....	2,554	10.00	.....	.....
Refugio, aviada.....	12,800	.....	7	8
Santa Anay An., aviadora.....	1,800	.....	30	40
Santa Anay An., aviada.....	600	.....	10	12
Sta. Gertrudis y An., aviadas.....	9,600	.....	10	12
Sta. Gertrudis y An., aviadora.....	28,800	1.00	85	86
Santo Tomas Apostol aviadoras.....	5,100	.....	2	3
San Felipe de Jesus, aviadora.....	3,600	.....	19	21
San Felipe de Jesus, aviada.....	1,200	.....	6	10
San Rafael y An., Trompillo.....	1,200	12.00	1,625	1,650
San Rafael y An., aviada.....	1,200	4.00	670	700
Soledad, aviada.....	900	5.00	720	740
Sorpresa, aviada. ...	900	5.00	340	360
.....	.....	.....	.....	.....
Mexico:				
Alacran.....	2,400	.....	2	60
Aldebarren.....	2,000	.....	75	85
Buen Despacho.....	3,000	.....	75	90
Dos Estrellas.....	3,000	30.00	2,100	2,150
La Esperanza (El Oro,).....	3,000	10.00	1,500	1,500
La Reformia, aviadores.....	2,000	.....	65	70
Providencia, pagadoras.....	1,600	.....	.....	.....
Providencia, liberadas.....	900	.....	.....	.....
Santa Ana, Esperanza.....	2,400	.....	90	.....
Michoacan:				
Luz de Borda, aviadora.....	3,000	.....	150	.....
Luz de Borda, aviado.....	1,000	.....	64	70
Nuevo Leon:				
La Fraternal.....	1,000	.....	575	625
Norias de Bajan.....	1,000	.....	800	850
Santiago y An., Tlal..	4,000	.....	.....	.....
San Luis Potosi:				
Concepcion y An.....	3,000	.....	80	90
El Barreno, aviadora.	2,000	2.00	54	56
Sta. Maria de la Paz..	2,400	20.00	740	750
San Diegoy Annexas.	2,400	4.00	8	10
Zacatecas:				
Asturiana y An.....	2,500	.....	85	90
Candelaria y Pinos..	2,500	10.00	120	150
Cubiertas.....	2,400	.....	.....	.....
Esperanza y An.....	2,400	.....	15	25
Lourdes.....	2,500	.....	15	20
Luz de Minillas, pagadoras.....	2,000	.....	15	30
Nueva Quebradilla, aviadoras.....	2,400	.....	95	100
Nueva Quebradilla, aviadas.....	600	.....	70	80
San Carlos y Annexas	2,500	20.00	150	160
Sta. Maria de Gaud..	2,500	10.00	55	60
Miscellaneous:				
Bartolome de Medina	2,000	1.50	65	70
Guadalupe Hacienda	20,000	6.00	.....	.....
La Luz Hac. (Pachuca.).....	3,750	.....	.....	.....
La Reina (Chihuahua.).....	192	.....	.....	.....
Naica (Chihuahua.)..	100	.....	11,000	13,000
Natividad (Oaxaca) aviadora	1,800	10.00	1,000	1,040
Natividad (Oaxaca) aviadas.....	600	4.00	.....	.....
San Francisco Hac..	6,000	1.00	70	85
Santa Ana Huantla Morelos.....	4,000	.....	.....	.....
Union Hacienda.....	3,000	5.00	200	225

*Values are in Mexican currency.

TORONTO, ONT. Nov. 7

Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.
Black Tail, g.....	$1	.04	.02	.....
Cariboo-McKinney, g.	1	.16	.....	.....
Cariboo Hydraulic, g.	1	.75	.....	.....
Center Star, g. s....	1	.23	.19	.....
Crows Nest, Coal & C.	100	3.50	2.00	.....
Dominion Coal, com..	100	.....	.....	.....
Dominion S. & I.....	100	.....	.....	.....
Fairview, g. s.....	1	.05	.02½	.....
Giant, g. s.....	1	.03	.02	.....
Deer Trail, g. s.....	1	.02½	.01	.....
Iron Mask, g. s.....	1	.06	.....	.....
Morrison, g. s.....	1	04	.02	.....
.....	.....	.....	.....	.....
Granby Smelter.....	$10	4.30	3.60	.....
Mountain Lion, g.....	1	.28	.20	.....
North Star, g. s.....	1	.13	.08½	.....
Nova Scotia Steel, com	100	.....	.....	.....
Payne, s. l.....	1	.15	.11	.....
Rambler Cariboo, g..	1	.40	.30	.....
Republic, g.....	1	.03	.01	.....
St. Eugene, g. s.....	1	.48	.40	.....
Virtue, g. s.....	1	.07	.04½	.....
War Eagle Con., g. s..	1	.12	.08½	.....
Sullivan, g. s.....	1	.06	.04	.....
Winnipeg, g. s..	1	.05	.04	.....
Wonderful, g. s.....	1	.64	.....	.....

g—Gold. s—Silver.

SALT LAKE CITY.* Nov. 7

Name of Company	Par Val	Shares.	High	Low	Sales.
Ajax.....	10	300,000	.04	.03	1,300
Butler Liberal.....	1	500,000	.16	.15	8,500
Carisa	1	300,000	.10½	.10½	700
Century.....	1	150,000	.....	.....	.....
Con. Mercur...	5	1,000,000	.98¾	.92	6,300
Comstock.....		.....	.18	.18	400
Daly-Judge	20	300,000	11.75	11.00	2,655
Daly West....	20	180,000	38.00	37.25	445
Emerald		.....	.....	.....	.....
Grand Central.	1	250,000	4.37½	4.37½	1,000
Ingot	½	500,000	.02½	.02	2,200
Keystone.....	1	500,000	.25	.24	1,000
La Reine.....	1	800,000	.02¼	.02¼	5,000
Little Chief....	10	490,000	.04	.04	1,000
L. Mammoth..	1	150,000	.32½	.32½	100
Manhattan.....	10	1,000,000	.00½	.00½	6,000
May Day.....	¼	400,000	.08⅝	.08	6,050
Mammoth	25	400,000	.....	.....	.....
M. Washington	⅛	300,000	.01½	.01½	1,000
Naildriver	2	300,000	.....	.....	.....
N. Y. Bonanza.	1	300,000	.24	.19	14,000
Northern Light	5	400,000	.....	.....	.....
Sacramento...	5	1,000,000	.25⅛	.25	3,700
Silver Shield...	20	800,000	.08	.08	50
So. Swansea....	1	300,000	.....	.....	.....
Star Con.....	1	400,000	.32¼	.31	12,000
Tetro.....	1	300,000	.34½	.33¼	500
Uncle Sam Con.	1	500,000	.22½	.22	2,000
Utah.....		.....	.59	.59	2,100
Victor Con.....	1	500,000	.....	.....	.....
Wabash	1	500,000	.07	.07	1,100
Yankee Cons...	1	500,000	.43	.42	1,100

*By our Special Correspondent. All mines are in Utah. Total sales, 78,100 shares.

PHILADELPHIA, PA *

Name and Location of Co.	Par val.	Nov. 4 H.	Nov. 4 L.	Nov. 5. H.	Nov. 5. L.	Nov. 6. H.	Nov. 6. L.	Nov. 7. H.	Nov. 7. L.	Nov. 9. H.	Nov. 9. L.	Nov. 10. H.	Nov. 10. L.	Sales
Am. Alkali, Mich	$50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Cement...	10	.....	.....	.....	.....	7	.....	.....	.....	7	6⅞	.....	.....	52
Cambria Iron, Pa	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cambria St , Pa	50	18¾	18⅛	18⅝	18	18¼	18	18⅛	18	18⅛	.....	18	.....	3,700
Penn. Steel, pfd	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	75	.....	30
Susq. I & S., Pa	5	¾	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	120
United Gas Imp.	50	80½	80	80	78⅞	79⅝	79	79⅜	.....	79⅝	79½	79¾	79½	2 314
Warwick I. & S.	10	3¼	3¼	3⅛	3¼	.....	.....	.....	.....	.....	.....	.....	.....	703
Diamond Steel.	50	⅜	¼	⅜	.....	⅜	.....	.....	.....	.....	.....	⅜	.....	219
Lehigh Navig'n	50	65⅜	.....	.....	.....	65⅜	65¼	.....	.....	.....	.....	.....	.....	43
Philadelphia....	50	36¼	36	36	.....	35¾	.....	.....	.....	36	.....	36¼	35¼	1,150
U. S. Steel.....	100	13¼	12⅝	12½	10⅞	11	10⅛	11⅛	10⅛	11⅜	11⅛	10¼	10	22,832
U. S. Steel. pf..	100	59	57⅝	57¼	55	54½	52½	53¼	52½	53¼	50½	51⅜	49⅝	20,054

Total sales 51,226.

LONDON. Oct. 30

Name and Country of Company.	Shares Issued.	Par value. £. s. d.	Latest dividend. Amt. s. d.	Latest dividend. Date.	Quotations. Buyers. £ s. d.	Quotations. Sellers. £ s. d.
American:						
Alaska-Treadwell, Alaska, g.....	200,000	5 0 0	1 6	Oct., 1903	4 2 6	4 7 6
Anaconda, Montana, c. s	1,200,000	5 0 0	2 0	Nov., 1903	3 7 6	3 10 0
Camp Bird, Colorado, g.....	820,000	1 0 0	9	Nov., 1903	1 6 3	1 8 9
Copiapo, Chile, c.....	112,500	2 0 0	6 10	May, 1903	1 5 0	1 10 0
De Lamar, Idaho, g. s.....	80,000	1 0 0	2 0	Oct., 1903	12 6	15 0
El Oro, Mexico, g. s.....	1,080,000	1 0 0	1 6	July, 1903	1 6 3	1 8 9
Frontino & Bolivia, Colombia, g. s...	128,662	1 0 0	3 0	July, 1901	8 9	11 3
Le Roi, British Columbia, g. s.....	200,000	5 0 0	5 0	Nov., 1899	8 9	11 3
Le Roi No. 2, British Columbia, g.....	120,000	5 0 0	5 0	May, 1902	12 6	15 0
Montana, Montana, g. s.....	657,128	1 0 0	6	April 1896	1 6	2 0
Standard, Arizona, c.....	400,000	4 0	2½	Sept., 1903	3 6	4 6
Stratton's Independence, Colorado, g	1,000,007	1 0 0	1 0	Aug., 1903	5 0	5 6
St. John del Rey, Brazil, g.....	546,265	1 0 0	8	June, 1903	15 0	16 0
Tomboy, Colorado, g.....	300,000	1 0 0	1 0	June, 1902	1 5 0	1 10 0
Utah Consolidated, Utah, c. g.....	300,000	1 0 0	6 3	July, 1903	5 15 0	6 0 0
Ymir, British Columbia, g.....	200,000	1 0 0	1 0	Mar., 1902	5 0	7 6
European:						
Linares, Spain, l.....	15,000	3 0 0	1 0	Mar., 1903	2 0 0	2 10 0
Mason & Barry, Portugal, c.....	185,172	1 0 0	11 0	May, 1903	3 7 6	3 12 6
Rio Tinto, Spain, c.....	325,000	5 0 0	32 6	Nov., 1903	12 6	17 6
Rio Tinto, pref., Spain, c.....	325,000	5 0 0	2 6	Nov., 1903	0 0	5 0
Tharsis, Spain, c.....	625,000	2 0 0	6 0	May, 1903	17 6	4 2 6
West Australian:						
Associated, g.....	495,388	1 0 0	2 0	July, 1903	2 13 9	2 15 0
Cosmopolitan Proprietary, g.....	400,000	1 0 0	1 0	May, 1903	15 6	16 6
Golden Horse Shoe, g.....	300,000	5 0 0	6 0	Apr., 1903	8 1 3	8 3 9
Great Boulder Proprietary, g.....	1,750,000	2 0	9	Sept. 1903	1 7 9	1 8 3
*Great Fingall Consolidated, g.....	250,000	1 0 0	6 0	Oct., 1903	9 3 9	9 6 3
*Ivanhoe g.....	200,000	5 0 0	5 0	Oct., 1903	8 8 9	8 11 3
Kalgurli, g.....	120,000	1 0 0	2 6	Oct., 1903	4 11 3	4 13 9
Lake View Consols, g.....	250,000	1 0 0	rts.	Aug., 1902	1 12 6	1 15 0
Oroya-Brownhill, g.....	450,000	1 0 0	.. ..	.....	3 11 3	3 13 9
Miscellaneous:						
Brilliant Central, Queensland, g.....	100,000	1 0 0	.. ..	.....	3 2 6	3 7 6
Briseis, Tasmania, t.....	600,000	1 0 0	.. ..	.....	4 9	5 3
Broken Hill Proprietary, N. S. W., s. l	960,000	8 0	1 0	Aug., 1903	1 10 0	1 11 0
Mt. Lyell, Tasmania. c.....	275,000	3 0 0	4 3	Sept., 1903	2 10 0	2 15 0
Mt. Morgan, Queensland, g.....	1,000,000	1 0 0	3	Nov., 1903	2 18 3	2 18 9
Waihi, New Zealand, g.....	497,412	1 0 0	2 6	June, 1903	5 0 0	5 2 6
Indian:						
Champion Reef, g..	473,000	10 0	5 6	Aug., 1903	7 11 3	7 13 9
Mysore, g.....	566,043	10 0	4 0	Nov., 1903	6 15 0	6 17 6
Nundydroog, g.....	484,000	10 0	1 6	Nov., 1903	2 2 6	2 5 0
Ooregum, g	343,000	10 0	1 9	Aug., 1903	1 1 3	1 3 9
Ooregum, pref ..g.....	240,000	10 0	1 9	Aug., 1903	1 12 6	1 15 0
South African:						
Angelo, g.....	600,000	1 0 0	6 0	Aug., 1903	6 12 6	6 17 6
Bonanza, g.....	200,000	1 0 0	10 0	Aug., 1903	2 3 9	2 6 3
British South Africa..	4,436,019	1 0 0	rts.	May, 1889	2 3 3	2 5 3
Cape Copper, c.....	300,000	2 0 0	1 0	July, 1903	3 0 0	3 2 6
Cape Copper, pref., c.....	75,000	2 0 0	1 0	July, 1903	2 15 0	3 0 0
City & Suburban, g.....	340,000	4 0 0	4 0	Aug., 1903	6 0 0	6 5 0
Consolidated Gold-Fields.....	2,000,000	1 0 0	.. ..	.....	5 8 9	5 10 0
Crown Reef, g	120,000	1 0 0	20 0	Oct., 1903	17 10 0	18 0 0
De Beers Con., d.....	800,000	2 10 0	10 0	Aug., 1903	19 0 0	19 2 6
De Beers Con., deferred, d.....	1,000,000	2 10 0	15 0	Aug., 1903	20 1 3	20 3 9
East Rand Proprietary, g.....	930,000	1 0 0	5 0	Aug., 1903	6 18 9	7 1 3
†Ferreira, g.....	90,000	1 0 0	15 0	Aug., 1903	19 15 0	20 5 0
Geldenhuis Estate, g.....	200,000	1 0 0	6 0	Aug., 1903	6 0 0	6 2 6
Geduld g.....	400,000	1 0 0	rts.	Mar., 1902	6 2 6	6 3 9
Henry Nourse, g.....	125,000	1 0 0	10 0	Aug., 1904	8 0 0	8 5 0
Jagersfontein, d.....	200,000	5 0 0	6 0	Nov., 1889	28 12 6	28 17 6
Jubilee, g.....	50,000	1 0 0	5 0	July, 1903	4 15 0	5 5 0
Jumpers, g.....	100,000	1 0 0	5 0	Aug., 1899	3 0 0	3 5 0
Langlaagte Estate, g	470,000	1 0 0	3 0	Aug., 1903	3 12 6	3 15 0
May Consolidated, g.....	288,750	1 0 0	3 0	Aug., 1903	4 1 3	4 3 9
Meyer & Charlton, g.....	100,000	1 0 0	3 0	Aug., 1903	5 7 6	5 12 6
Modderfontein, g.....	290,000	1 0 0	rts.	Apr., 1902	8 7 6	8 10 0
Namaqua, c.....	94,331	2 0 0	2 0	June, 1903	3 5 0	3 10 0
New Primrose, g.	325,000	1 0 0	2 0	Aug., 1903	3 13 9	3 16 3
Rand Mines, g.....	1,795,956	5 0	4 0	Aug., 1902	9 7 6	9 10 0
Robinson, g.....	750,000	5 0 0	5 6	Aug., 1903	9 15 0	10 0 0
Robinson Deep, g.....	950,000	1 0 0	2 0	Aug., 1903	5 1 3	5 3 9
Rose Deep, g.....	425,000	1 0 0	2 0	Aug., 1903	7 17 6	8 2 6
Salisbury, g.....	100,000	1 0 0	2 0	Mar , 1899	1 12 6	1 15 0
Sheba, g.....	1,075,000	1 0 0	6	July, 1599	12 6	15 0
Village Main Reef, g.....	400,000	1 0 0	4 0	June, 1903	7 12 6	7 17 6
Wemmer, g.....	80,000	1 0 0	10 0	July, 1903	10 0 0	10 10 0

c—Copper. d—Diamonds. g—Gold. l—Lead. s—Silver. t- Tin. *Ex-dividend. †Ex-rights.

LONDON (By Cable.)*

Name of Company.	Nov. 4. £. s. d.	Nov. 11. £. s. d.	Name of Company.	Nov. 4. £. s. d.	Nov. 11. £. s. d.
Anaconda.....	3 12 6	3 5 0	Johannesburg Invest....	2 13 9	2 16 3
British South Africa.....	2 2 6	2 3 9	Modderfontein.....	8 12 7½	8 7 6
Camp Bird.....	1 6 6	1 7 6	Rand Mines.....	9 3 9	9 5 0
Con. Gold Fields.....	5 7 6	5 10 0	Rio Tinto	49 5 0	49 0 0
De Beers Con. def.....	20 2 6	20 3 9	Simmer & Jack.....	1 6 10½	1 8 0
East Rand.....	6 17 6	6 17 6	Tomboy.....	1 11 3	1 7 6
El Oro, Mex..	1 8 9	1 7 6	.....	.....	.....

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. Oct. 29

Name of Company.	Country.	Product.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Opening. Fr.	Prices. Closing. Fr.
Alameda.....	California ...	Oil.....	1,000,000	1	9.50	6.00	5.50
Anzin	France	Coal	.....	.....	290.00	5,810.00	5,775.00
Boleo.....	Lower Cal....	Copper.....	12,000,000	500	62.50	1,400.00	1,575.00
Canadian-American	Canada.....	Coal.....	.....	20	.....	30.00	27.00
Champ d'Or.....	S. Africa.....	Gold.....	3,375,000	25	3.75	20.50	19.25
Courrieres	France	Coal	600,000	300	110.00	2,950.00	2,930.00
Fraser River.....	Brit. Col'mb..	Gold.....	250,000	25	.....	5.50	5.50
Huanchaca.....	Bolivia.....	Silver.....	40,000,000	125	5.00	86.50	80.75
Laurium.....	Greece.....	Zinc, Lead....	16,300,000	500	25.00	384.00	355.00
Malfidano.....	Italy	Zinc	12,500,000	500	50.00	575.00	571.00
Metaux, Cie. Fran. de.....	France	Metal dealers.	25,000,000	500	22.50	508.00	506.00
Mokta-el-Hadid.....	Algeria	Iron	18,312,000	500	40.00	835.00	840.00
Nickel.....	N. Caled'nia..	Nickel.....	15,000,000	250	22.50	483.00	485.00
Sedalia & California.....	California....	Oil.....	1,000,000	1	.....	5.50	3.50
Vielle Montagne.....	Belgium.....	Zinc.....	9,000,000	30	30.00	684.00	683.00
Wyoming	California....	Oil	.....	25	.....	304.00	309.00

ST. LOUIS, MO.* Nov. 7.

Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.	Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.
Am.-Nettie, Colo....	$10	300,000	$0.25	$0.75	Columbia Lead, Mo.	$10	50,000	$2.50	$3.50
Catherine Lead, Mo.	10	50,000	1.50	2.25	Con. Coal, Ill.....	100	50,000	21.00	22.00
Central Coal & C....	100	51,250	52.50	55.00	Doe Run Lead Co..	100	15,000	110.00	115.00
Central C. & C., pf..	100	18,750	68.00	75.00	Granite Bimet. Mt..	10	100,000	.48	.77
Central Lead, Mo...	100	10,000	110.00	120.00	St. Joe Lead, Mo,...	10	600,000	14.50	16.00

*By our Special Correspondent.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

(See also Market Reviews.)

	Cust.	Meas.	Price.
ABRASIVES—			
Carborundum, f.o.b. Niagara Falls, Powd., F. FF. FFF.	lb.		$0.08
Grains	"		.10
Corundum, N. C.	"		.07@.10
Chester, Mass.	"		.04¼@.05
Barry's Bay, Ont.	"		.07½@.09⅛
Mont. car-lots, f.o.b. Chicago	"		.07@.07½
Crushed Steel, f.o.b. Pittsburg	"		.05½
Emery, Turkish flour in kegs	"		.03⅛
Grains, in kegs	"		.05@.05½
Naxos flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Chester flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01⅛
Grains, in kegs	"		.02⅛
Crude, ex-ship N. Y.; Abbott (Turkey)	lg. ton		26.50@30.00
Kuluk (Turkey)	"		22.00@24.00
Naxos (Greek) h. gr.	"		26.00
Garnet, as per quality	sh. ton		25.00@35.00
Pumice Stone, Am. Powd.	lb.		.01½@.02
Italian, powdered	"		.01⅛
Lump, per quality	"		.04@.05
Rottenstone, ground	"		.02¼@.04⅛
Lump, per quality	"		.06@.20
Rouge, per quality	"		.10@.30
Steel Emery, f.o.b. Pittsburg	"		.07
ACIDS—			
Boracic, crystals	"		.10¾@.11
Powdered	"		.11¼@.11½
Carbonic, liquid gas	"		.12½
Chromic, crude	"		.20
Hydrofluoric, 30%	"		.03
48%	"		.05
60%	"		.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"		.06
ALCOHOL—Grain	gal.		2.45@2.47
Refined wood, 95@97%	"		.50@.55
Purified	"		1.25@1.30
ALUM—Lump	100 lbs.		1.75
Ground	"		1.85
Porous	"		1.00
Powdered	"		3.00
Chrome, com'l	"		2.75@3.00
ALUMINUM—			
Nitrate	lb.		1.50
Oxide, com'l, common	"		.06½
Best	"		.20
Pure	"		.80
Hydrated	100 lbs.		2.60
Sulphate, com'l	"		1.25@1.50
AMMONIA—			
Aqua, 16°	lb.		.03
18°	"		.03¼
20	"		.03¾
26°	"		.05⅛
AMMONIUM—			
Carbonate, lump	"		.07½
Powdered	"		.08¼
Muriate	"		.05⅝
Lump	"		.09
Nitrate, white pure (98%)	"		.12
Phosphate, com'l	"		.09
Pure	"		.12
ANTIMONY—Glass	"		.30@.40
Needle, lump	"		.05½@.06
Powdered, ordinary	"		.05¾@.07¾
Oxide, com'l white, 95%	"		.03½
Com'l white, 95%	"		.12
Com'l gray	"		.07
Sulphuret, com'l	"		.16
ARSENIC—White powd.	"		.03@.03¼
Red	"		.06⅜@.06¼
ASPHALTUM—			
Ventura, Cal.	sh. ton		32.00
Cuban	lb.		.01½@.03¼
Egyptian, crude	"		.05¼@.06
Trinidad, refined	sh. ton		35.00
San Valentino (Italian)	lg. ton		16.00
Seyssel (French), mastic	sh. ton		21 00
Gilsonite, Utah, ordinary	lb.		.03
Select	"		.03¾
BARIUM—			
Carb. Lump, 80@90%	sh. ton		25.00@27.00
92@98%	"		26.00@29.00
Powdered, 80@90%	lb.		.01¾@.02
Chloride, com'l	100 lbs.		1.67½@1.76
Chem. pure cryst.	lb.		.05
Nitrate, powdered	"		.05⅞
BARIUM	Cust.	Meas.	Price.
Sulphate (Blanc Fixe)	lb.		$0.02
BARYTES—			
Am. Crude, No. 1	sh. ton		9.50
Crude, No. 2	"		8.00
Crude, No. 3	"		7.00
Floated	"		18.50
Foreign gray	"		13.50
Snow white	"		17.00
Floated	"		18.00
BAUXITE—Ga. or Ala. Mines:			
First grade	lg. ton		5.50
Second grade	"		4.75
BISMUTH—Subnitrate	lb.		2.00
Subcarbonate	"		2.25
BITUMEN—"B"	"		.06¼
"A"	"		.05
BONE ASH	"		.02¼@.02½
BORAX	"		.07¼@.07½
BROMINE—Bulk	"		.48
CADMIUM—Metallic	"		1.40
Sulphate	100 lbs.		2.00@2.50
CALCIUM—Acetate, gray	"		1.40
" brown	"		.90
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton		70.00
Carbonate, ppt.	lb.		.05
Chloride	100 lbs.		.70@.90
CEMENT—			
Portland, Am., 400 lbs.	bbl.		1.75@2.00
Foreign	"		1.95@2.50
"Rosendale," 300 lbs.	"		.85
Slag cement	"		1.50@1.60
CERESINE—			
Orange and Yellow	lb.		.13
White	"		.14
CHALK—Lump, bulk	sh. ton		3.00
Ppt. per quality	lb.		.04@.05¼
CHLORINE—Liquid	"		.30
Water	"		.10
CHROME ORE			
(50% ch.) ex-ship N. Y.	lg. ton		24.75
Bricks f.o.b. Pittsburg	M		175.00
CLAY, CHINA—Am. com., ex-dock, N. Y.	lg. ton		8.25
Am. best, ex-dock, N. Y.	"		9.25
English, common	"		10.50
Best grade	"		16.25
Fire Clay, ordinary	sh. ton		4.25
Best	"		6.00
Slip Clay	"		5.00
COAL TAR PITCH	gal.		.08
COBALT—Carbonate	lb.		1.75
Nitrate	"		1.50
Oxide—Black	"		2.26@2.30
Gray	"		2.28@2.40
Smalt, blue ordinary	"		.06
Best	"		.20
COPPERAS—Bulk	100 lbs.		.47½
In bbls.	"		.52½
COPPER—Carbonate	lb.		.18@.19
Chloride	"		.25
Nitrate, crystals	"		.35
Oxide, com'l	"		.19
CRYOLITE	"		.06½
EXPLOSIVES—			
Blasting powder, A	25-lb. keg		.65
Blasting powder, B	"		1.40
"Rackarock," A	lb.		.25
"Rackarock," B	"		.18
Judson R.R. powder	"		.10
Dynamite (20% nitro-glycerine)	"		.13
(30% nitro-glycerine)	"		.14
(40% nitro-glycerine)	"		.15
(50% nitro-glycerine)	"		.16½
(60% nitro-glycerine)	"		.18
(75% nitro-glycerine)	"		.21
Glycerine for nitro (32-2-10° Be.)	"		.12½@.12⅝
FELDSPAR—Ground	sh. ton		8.00@9.00
FLINT PEBBLES—Dan. Best.	lg. ton		14.75
French, Best	"		11.75
FLOURSPAR—			
Am. lump, 1st grade	sh. ton		14.40
2d grade	"		13.90
Gravel and crushed, 1st gr.	"		13.40
2d grade	"		12.40
Ground, 1st grade	"		17.90
Ground, 2d grade	"		16.50
Foreign, lump	"		8.00@12.00
Ground	"		11.50@14.00
FULLER'S EARTH—Lump	100 lbs.		.80
Powdered	"		.85
	Cust.	Meas.	Price.
GRAPHITE—Am. f.o.b. Providence, R. I., lump	sh. ton		$8.00
Pulverized	"		30.00
Am. pulv., other than R. I., f. o. b., New York	"		45.00
Best flake	"		150.00
German, com. pulv.	lb.		.01¼@.01¼
Best pulverized	"		.01½@.02
Ceylon, common pulv.	"		.02¾@.03⅛
Best pulverized	"		.04@.08
Italian, pulv.	"		.01¼
GYPSUM—Ground	sh. ton		8.00@8.50
Fertilizer	"		7.00
Rock	lg. ton		4.00
English and French	"		14.00@16.00
INFUSORIAL EARTH—Gr'd.			
American best	"		20.00
French	"		37.50
German	"		40.00
IODINE—Crude	100 lbs.		2.45
IRON—Muriate	lb.		.05
Nitrate, com'l	"		.01¼
True	"		.04
Oxide, pure copperas color	"		.05@.10
Purple-brown	"		.02
Venetian red	"		.01@.01½
Scale	"		.01@.03
KAOLIN—(See China Clay.)			
KRYOLITH—(See Cryolite.)			
LEAD—Acetate, white	"		.08¼@.08¼
Brown	"		.06¼@.06⅛
Nitrate, com'l	"		.06½
" gran	"		.08¼
LIME—Com., abt. 250 lbs.	bbl.		.82
Finishing	"		1.02
MAGNESITE—Greece.			
Crude (95%)	lg. ton		5.00@5.50
Calcined	sh. ton		15.50
Bricks, best imp., f.o b. N.Y.	M.		155.00
" domes., per qual., f.o.b. Pittsburg	"		130.00@200.00
MAGNESIUM—			
Carbonate, light, fine pd.	lb.		.05
Blocks	"		.07@.09
Chloride, com'l	"		.01¾
Fused	"		.20
Nitrate	"		.60
Sulphate	100 lbs		.75@.95
MANGANESE—			
Crude powd.			
70@75% binoxide	lb.		.01¼@.01½
75@85% binoxide	"		.01½@.02¼
85@90% binoxide	"		.02¼@.03¼
90@95% binoxide	"		.03¼@.05½
Carbonate	"		.16@.20
Chloride	"		.04
Ore, Foreign	unit		.22@.24
Domestic, 1st quality	"		.30
MARBLE—Flour	sh. ton		6.00@7.00
MERCURY—Bichloride	lb.		.77
MICA—N. Y. gr'nd, coarse	sh. ton		33.00@38.00
Fine	lb.		.00⅞@.02
Sheets are sold as to size and quality			
MINERAL WOOL—			
Slag, ordinary	sh. ton		19.00
Selected	"		25.00
Rock, ordinary	"		32 00
Selected	"		40.00
NICKEL Oxide, No. 1	lb.		1.00
No. 2	"		.60
Sulphate	"		.20@.21
OILS—Black, reduced 29 gr.:			
25@30, cold test	gal.		.13@.13½
15, cold test	"		.14@.14½
Zero	"		.18½@.19
Summer	"		.13@.13¼
Cylinder, dark steam ref.	"		.14½@.15½
Dark, filtered	"		.18½@.19
Light, filtered	"		.20½@.21
Extra cold test	"		.25@.31
Gasoline, 86 @90	"		.17@.22
Naphtha, crude, 68°@72°	bbl.		12.40
"Stove"	gal.		.15
Linseed, domestic raw	"		.34@.37
Boiled	"		.39
Calcutta, raw	"		.65
OZOKERITE	lb.		.11¼
PAINTS AND COLORS—			
Chrome green, common	"		.03
Pure	"		.16
Yellow, common	"		.10¼
Best	"		.14
Lampblack, com'l	"		.04½
Refined	"		.07
Litharge, Am. pow'd	"		.05½@.06
English flake	"		.08¼@.08½
Glassmakers'	"		.08⅛@.08¼
PAINTS AND COLORS—	Cust.	Meas.	Price
Metallic, brown	sh. ton		$19.00
Red	"		15 00
Ocher, Am. common	"		9.25@10.00
Best	"		21.25@25.00
Dutch, washed	lb.		.04¾
French, washed	"		.01⅛@.01⅜
Orange mineral, Am	"		.02
Foreign, as to make	"		.06¾@.11⅛
Paris green, pure, bulk	"		.11¾
Red lead, American	"		.06¼@.06½
Foreign	"		.06½@.07¾
Turpentine, spirits	gal.		.59½@.60
White lead, Am., dry	lb.		.05 @.05¼
American, in oil	"		.06 @.07
Foreign, in oil	"		.07 @.09
Zinc, white, Am., ex. dry	"		.04½@.04¾
Foreign, red seal, dry	"		.06@.06¼
Green seal, dry	"		.06⅛@.09¾
POTASH—			
Caustic, ordinary	"		.04¼@.04⅞
Elect. (90%)	"		.06¼
POTASSIUM—			
Bicarbonate cryst.	"		.08¼
Powdered or gran.	"		.14
Bichromate, Am	"		.08½@.08¾
Scotch	"		.08½@.09
Bromide	"		@.30
Carbonate (80@85%)	"		.03¼@.04⅝
Chlorate, powd.	"		.06¾@.07¾
Crystals	"		.06½@.07
Chromate	"		.35
Cyanide (98@99%)	"		.20
Kainit	lg. ton		9.50
Manure salt, 20%	100 lbs.		.66
D'le Manure Salt, 48@53%	"		1.12
Muriate, 80@85%	"		1.83
95	"		1.86
Permanganate	lb.		.09½@.09⅝
Prussiate, yellow	"		.14@.14½
Red	"		.36
Sulphate, 90%	100 lbs.		2.11
96%	"		2.14
Sylvanit	unit		.41
QUARTZ—(See Silica).			
SALT—N. Y. com. fine 280 lbs	bbl.		.72@1.18
N. Y. agricultural	sh. ton		4.40
SALTPETRE—Crude	100 lbs.		3.35@3.40
Refined	"		4.00@4.50
SILICA—Best foreign	lg. ton		10.00@11.00
Ground quartz, ord.	sh. ton		6.00@8.00
Best	"		12.00@13.00
Lump quartz	"		2.50@4.00
Glass sand	"		2.75
SILVER—Chloride	oz.		.60
Nitrate Crystals	"		.38
Oxide	"		.85@1.10
SODIUM—			
Bicarb., ord., bulk f.o b. wk's.	100 lbs.		1.25
Extra domes., f.o.b. w'ks.	"		3.50
Foreign, f.o.b. N. Y.	"		1.60
Bichromate	lb.		.06¼
Carbonated ash, high test, in bags, f.o.b. works	100 lbs.		.75@.80
Foreign, f.ob. N. Y.	"		.90@.92½
Caustic, 70@76% f.o b. w'ks.	"		1.75@1.80
" 60%	"		1.85@1.90
Foreign, f.o.b N. Y.	"		1.50@2.00
Chlorate, com'l	"		.06¾@.07
Hyposulphite, Am.	"		1.60@1.65
German	"		1.70@1.90
Nitrate, nearby	"		2.10@2.12½
Shipments	"		2@2.07½
Peroxide	lb.		.45
Phosphate	"		.02¼@.02¾
Prussiate	"		.10½
Sal soda, f.o.b. works	100 lbs.		.60
Foreign, f.o.b. N. Y.	"		.67½
Silicate, conc.	lb.		.05
Com'l	"		.01
Sulphate, com'l	100 lbs.		.82½
Sulphide	lb.		.01¼
Sulphite crystals	"		.02½
SULPHUR—Roll	100 lbs.		1.85
Flour	"		1.90
Flowers, sublimed	"		2.25
TALC—N C., 1st grade	sh. ton		20.00
N. Y., Fibrous, best	"		10.28
French, best	100 lbs.		2.00
Italian, best	"		2.25
TAR—Regular	bbl.		2.70
Oil, bbl.	"		4.70
TIN—Crystals, bbl	lb.		.20
Oxide	"		.45
URANIUM—Oxide	"		2.25@3.00
ZINC—Metallic, ch. pure	"		.07@.09¾
Carbonate, ppt.	"		.09
Chloride so ution, com'l	"		.02¾
Chloride granular	"		.15
Dust	"		.04¾@.04⅞
Sulphate	"		.02¼@.02¾

THE RARE EARTHS.

BORON—Nitrate	lb.		$1.50
CALCIUM—Tungstate (Scheelite)	"		.60
CERIUM—Nitrate	"		10.00
DIDYMIUM—Nitrate	"		25.00
ERBIUM—Nitrate	"		40.00
GLUCINUM—Nitrate	"		20.00
LANTHANUM—Nitrate	"		30.00
LITHIUM—Carbonate	"		1.35
LITHIUM—Nitrate	oz.		.60
STRONTIUM—Nitrate	lb.		.07½@.08¾
THORIUM—Nitrate 49@50%	"		4.50
URANIUM—Nitrate	oz.		.25
YTTRIUM—Nitrate	lb.		40.00
ZIRCONIUM—Nitrate	"		8.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.